HORIZON

AIR MEASUREMENT SERVICES, INC.

Horizon Test #: W07-042-FRB
Date Tested: April 20, 2005
Report Date: May 26, 2005
Revision Number: 0

ANNUAL EMISSIONS TEST OF LANDFILL GAS FLARE #2 BRADLEY LANDFILL

Permit to Operate No. F67269
Facility ID Number: 050310

Prepared for:

Waste Management Recycling and
Disposal Services of California, Inc.
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HORIZON
AIR MEASUREMENT SERVICES, INC.

May 26, 2005

Mr. John Workman
Waste Management
25772 Springbrook Road
Saugus, California 91350

Dear Mr. Workman:

Please find enclosed three copies of the final report entitled "Annual Emissions Test of Landfill Gas Flare."

If you have any questions please call me at (805) 498-8781.

Sincerely,

HORIZON AIR MEASUREMENT SERVICES, INC.

Robert D. Carrier

Robert D. Carrier
Project Manager

RC:lmb

cc: Mr. Andrew Washington, Shaw Group

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1. INTRODUCTION

Under the Bradley Landfill and Recycling Center (BLRC) site specific Rule 1150.1 compliance plan, Waste Management Recycling and Disposal Services of California, Inc. is required to conduct an annual source test on landfill gas Flare #2 located at BLRC (Permit to Operate # F67269). Horizon Air Measurement Services, Inc. (Horizon) had been retained for this purpose.

All testing/analytical procedures conformed to those outlined in Horizon Test Plan No. W07-042-TP, which had been previously approved by the South Coast Air Quality Management District (SCAQMD). Horizon completed the source testing on April 20, 2005.

Two samples were taken for each parameter of interest (Table 1-1) during each test with the exception of trace organic compounds and reduced sulfur compounds, for which only one sample per location was collected. The results of the testing program, with respect to Permit limits, are provided in Section 2 - Results Summary.

A brief description of the flare and flare operating conditions during testing is provided in Section 3. Section 4 provides a summary of sampling/analytical procedures utilized. Section 5 provides a more detailed results summary/discussion.

Table 1-1
Compounds of Interest - Flare #2
Waste Management - Bradley Landfill
April 20, 2005

Parameter	Location	Method	Number of Samples Per Source
Total Non Methane Hydrocarbons	Inlet	SCAQMD Method 25.1	2
	Outlet	SCAQMD Method 25.3	2
Reduced Sulfur Compounds (C_1-C_3) Including H_2S	Inlet	SCAQMD Method 307.91 Equivalent	1
Speciated Organic Compounds	Inlet	Whole Air/GC-MS (1150 list)	1
	Outlet	Whole Air/GC-MS (1150 list)	1
Particulate Matter	Outlet	SCAQMD Method 5.1	2
Oxides of Nitrogen	Outlet	SCAQMD Method 100.1	2
Carbon Monoxide	Inlet	SCAQMD Method 25.1	2
	Outlet	SCAQMD Method 100.1	2
Oxygen	Inlet	SCAQMD Method 25.1	2
	Outlet	SCAQMD Method 100.1	2
Carbon Dioxide	Inlet	SCAQMD Method 25.1	2
	Outlet	SCAQMD Method 100.1	2
Methane	Inlet	SCAQMD Method 25.1	2
	Outlet	SCAQMD Method 25.3	2
Flow Rate/Temperature	Inlet	SCAQMD Method 2.3	2
	Outlet	SCAQMD Method 5.1/Calculated	2
Moisture	Outlet	SCAQMD Method 5.1	2
	Inlet	SCAQMD Method 4.1	2
BTU Content	Inlet	SCAQMD Method 25.1	2

2. SUMMARY OF RESULTS

The results of the testing program conducted on Flare #2 are provided in Table 2-1. Emission rates of oxides of nitrogen, carbon monoxide, total particulate matter, total non-methane organics and total sulfur compounds (as SO_2) were within Permit limitations. A more detailed discussion of results is provided in Section 5.

Table 2-1
Summary of Results
Waste Management - Bradley Landfill
Flare #2
April 20, 2005

Parameter	Measured Emission Rate*	Permitted Emission Rate
Oxides of Nitrogen, as NO_2	1.56 lb/hr 0.045 lb/MMBtu	2.58 lb/hr, 0.06 lb/MMBtu
Total Particulate Matter	0.25 lb/hr	1.31 lb/hr
Carbon Monoxide	<0.95 lb/hr	2.37 lb/hr
Total Non Methane Organics, as CH_4	0.081 lb/hr	0.66 lb/hr
Total Non Methane Organics, as C_6	0.83 ppm C_6 @ 3% O_2	20 ppm C_6 @ 3% O_2 (Rule 1150.1)
Total Sulfur Compounds, as SO_2	0.68 lb/hr	3.16 lb/hr

* Measured emission rates shown are the average of two test runs (samples).
** From facility meter.
*** Determined using SCAQMD Method 2.3.

3. FLARE DESCRIPTION AND OPERATION

3.1 Flare Description

The landfill gas flare consists of an insulated steel cylinder 50 feet high and 96 inches inside diameter (see Figure 3-1). Landfill gas flow rate was continuously monitored and recorded on a strip chart by the facility. Flare operating temperature during the test was set at 1600 °F. Flare temperature was continuously monitored by the facility.

Condensate flow rate is limited to five gallons per minute by the Permit. The source test was conducted at a condensate flow rate of 3.8 gallons per minute.

Strip chart records of the flare operating conditions during testing are provided in Appendix G.

3.2 Sample Location

Flare exhaust samples were obtained from each of two ports positioned at right angles, located five feet from the top of the flare and approximately 45 feet above ground level.

Inlet samples were obtained from the 10-inch diameter (ID) landfill gas line supplying the flare 80 inches (eight diameters) downstream and 30 inches (three diameters) upstream of any flow disturbance.

3.3 Flare Operation During Testing

The flare was operated under the following conditions during the source test period:

	Run 1	**Run 2**
Flare Temperature -	1575 °F	1572 °F
Landfill Gas Flow Rate -	1758 scfm	1767 scfm
Condensate Injection Rate -	3.8 gpm	3.8 gpm

Raw process data is included in Appendix G, Process Data.

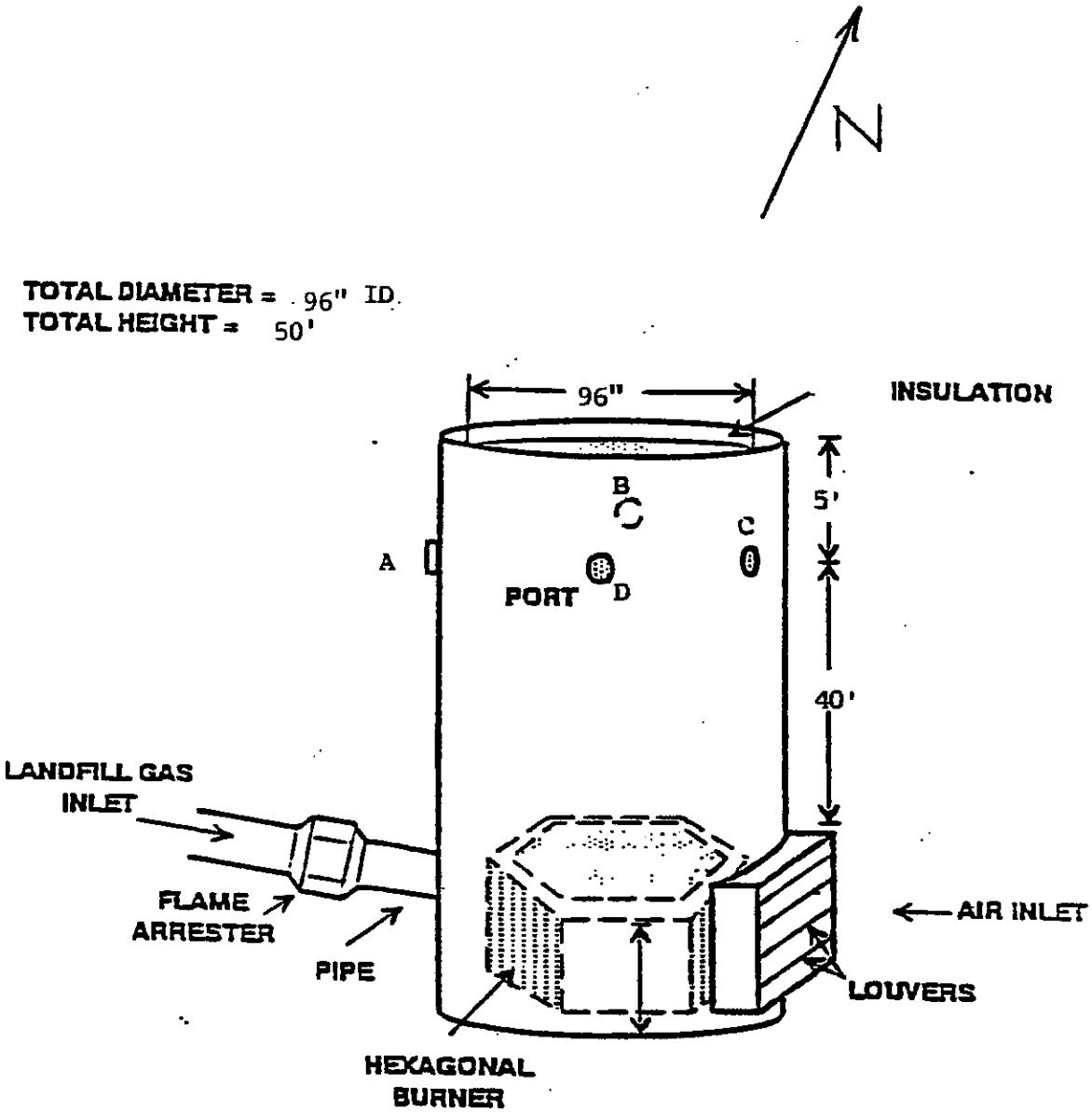

N
TOTAL DIAMETER = 96" ID.
TOTAL HEIGHT = 50'
96"
INSULATION
5'
B
C
A
PORT
D
40'
LANDFILL GAS
INLET
FLAME
ARRESTER
PIPE
AIR INLET
LOUVERS
HEXAGONAL
BURNER

Figure 3-1

4. SAMPLING/ANALYSES

The sampling/analytical program had been designed to quantify the parameters of interest outlined in Table 1-1.

4.1 Sample Location

4.1.1 Flare Exhaust

At the flare exhaust 24 sample points (12 per diameter), determined in accordance with Method 1, were utilized for the determination of the following compounds:

- particulate matter
- NO_X
- CO
- O_2/CO_2
- flow rate
- moisture

The exact locations of the sampling points are provided in Appendix D, Field Data Sheets. A description of SCAQMD Method 1.1 is provided in Appendix A.

One sample points at the center of the stack was utilized for the collection of the following compounds:

- speciated organic compounds
- total non methane hydrocarbons
- methane

4.1.2 Landfill Gas Supply Line

Eight sample points, chosen in accordance with SCAQMD Method 1.1, were used to gather velocity data.

A single sample point was utilized for the collection of the following compounds:

- total non methane hydrocarbons
- methane
- CO
- CO_2/O_2
- reduced sulfur compounds
- speciated organic compounds
- BTU content
- moisture

4.2 Moisture

4.2.1 Inlet - SCAQMD Method 4.1

Landfill gas moisture content was determined using SCAQMD Method 4.1. Two, one hour test runs were conducted in conjunction with the outlet particulate and SCAQMD Method 100.1 testing. A description of SCAQMD Method 4.1 is provided in Appendix A.

4.2.2 Outlet - SCAQMD Method 5.1

Moisture content of the flare exhaust was determined using SCAQMD Method 4.1 in conjunction with SCAQMD Method 5.1, as detailed in Appendix A.

4.3 Flow Rate

4.3.1 Inlet

Landfill gas flow rate was determined using SCAQMD Method 2.3. A description of SCAQMD Method 2.3 is provided in Appendix A.

4.3.2 Outlet - SCAQMD Method 5.1

The landfill flare flow rate was monitored in conjunction with SCAQMD Method 5.1, as detailed in Appendix A. However, since the flare exhaust velocity was below the applicable limit (0.05 in. WG ΔP) of SCAQMD Method 2.1/5.1, the exhaust flow rate was calculated stoichiometrically based upon the landfill gas composition and stack dilution.

4.4 Particulate Matter (Outlet) - SCAQMD Method 5.1

Horizon conducted two, 60-minute test runs on the flare exhaust for particulate matter determination in accordance with SCAQMD Method 5.1 protocol. Twenty-four traverse points were utilized for the collection of particulate matter at the flare exhaust. A description of SCAQMD Method 5.1 is provided in Appendix A. Stack gases were withdrawn through an integral quartz nozzle and probe.

4.5 Oxides of Nitrogen, Carbon Monoxide, Carbon Dioxide, Oxygen (Continuous Emissions Monitoring) - SCAQMD Method 100.1

Two, 60-minute test runs were conducted at the flare exhaust. Twenty-four sample points were utilized. All sampling was performed under the guidelines of SCAQMD Method 100.1 as detailed in Appendix A.

4.6 Hydrogen Sulfide (H_2S), and C_1 - C_3 Sulfur Compounds (Inlet) - SCAQMD Method 307.91 Equivalent

Hydrogen sulfide and C_1 - C_3 sulfur compound samples were collected at the inlet of the flare using the Tedlar bag collection system depicted in Appendix A. All system components coming in contact with the landfill gas were Teflon.

Hydrogen sulfide and C_1 - C_3 sulfur compounds were analyzed using a Method 307.91 equivalent by AtmAA, Inc. Equivalency had been formally granted by SCAQMD to AtmAA, Inc. for this Method.

4.7 Speciated Organic Compounds - SCAQMD Rule 1150.1 List

4.7.1 Inlet

Speciated organic compounds were collected at the flare inlet of the landfill gas using the Tedlar bag collection system depicted in Appendix A. All system components coming in contact with the landfill gas were Teflon or stainless steel. Speciated organic compounds (SCAQMD Rule 1150.1 list) were identified and quantified using GC/MS analytical procedures.

4.7.2 Outlet

Speciated organic compound samples were collected in conjunction with the particulate/CEM testing at the outlet using Tedlar bag method as depicted in Appendix A. Each sample was then analyzed for speciated organic compounds (SCAQMD Rule 1150.1 list) using GC/MS procedures.

4.8 Total Non Methane Hydrocarbons, Methane, Carbon Dioxide and Carbon Monoxide

4.8.1 Inlet - SCAQMD Method 25.1

Total non methane hydrocarbons, methane, CO_2 and CO concentration were determined at the flare inlet from duplicate samples using SCAQMD Method 25.1. A description of SCAQMD Method 25.1 is provided in Appendix A.

4.8.2 Outlet - SCAQMD Method 25.3

Duplicate samples were obtained for total non methane hydrocarbon and methane concentration determination using SCAQMD Method 25.3. A description of SCAQMD Method 25.3 is provided in Appendix A.

5. RESULTS DISCUSSION

Detailed results of the criteria testing conducted on Flare #2 on April 20, 2005 are presented in Table 5-1. Speciated organic compound destruction efficiencies and emission rates are provided in Table 5-2.

Since the flare exhaust velocity was below the applicable range (>0.05 ΔP inches water gauge) of SCAQMD Method 2.1, the flare exhaust flow rate for each test run was calculated stoichiometrically based upon the composition of the landfill gas and the exhaust stack dilution. Oxide of sulfur emission rate was calculated based upon the landfill gas total sulfur compound concentration and flow rate (see Appendix B).

Table 5-1
Summary of Results
Waste Management - Bradley Landfill
Flare #2
April 20, 2005

	LANDFILL GAS			FLARE EXHAUST		
Run Number	1	2	Avg.	1	2	Avg.
STACK GAS CHARACTERISTICS						
Temperature, degrees F	117	125	121	1651	1643	1647
Moisture, %	5.5	4.4	5.0	15.6	15.3	15.5
Flow Rate, acfm	1927	1956	1942			
Flow Rate, dscfm	1617	1638	1628	10716 *	10846 *	10781 *
Fixed Gases						
Oxygen, %	2.19	-	2.19	9.35	9.34	9.35
Carbon Dioxide, %	30.15	-	30.15	10.75	10.61	10.68
Methane, %	35.20	-	35.20	0.00	0.00	0.00
BTU Value, Btu/scf	356	-	356	-	-	-
EMISSIONS						
Oxides of Nitrogen						
ppm	-	-	-	20.2	19.5	19.9
ppm @ 3 % O2	-	-	-	31.3	30.2	30.8
lb/hr	-	-	-	1.573	1.540	1.557
lb/MMBtu	-	-	-	0.046	0.044	0.045
Carbon Monoxide						
ppm	-	-	-	< 20	< 20	< 20
ppm @ 3 % O2	-	-	-	< 31	< 31	< 31
lb/hr	-	-	-	< 0.95	< 0.96	< 0.95
lb/MMBtu	-	-	-	< 0.028	< 0.027	< 0.028
Total Particulate Matter						
gr/dscf	-	-	-	0.0030	0.0023	0.0027
lb/hr	-	-	-	0.28	0.21	0.25
Total Non-Methane Hydrocarbons (Reactive Organic Compounds)						
ppm, as Methane	2173	-	2173	2.97	-	2.97
lb/hr, as Methane	8.94	-	8.94	0.081	-	0.081
Sulfur Compounds						
Hydrogen Sulfide, ppm	40.2	-	40.2	< 0.50	-	< 0.50
Total Sulfur, ppm as H2S	41.3	-	41.3	-	-	-
Oxides of Sulfur**						
lb/hr	-	-	-	0.68	-	0.68

* Flow Rate calculated stoichiometrically
** Calculated from sulfur balance

Table 5-2
Trace Organic Species
Destruction Efficiency Results
Waste Management - Bradley Landfill
Flare #2
April 20, 2005

Species	Inlet			Outlet			Destruction Efficiency (%)
	Concentration (ppb)		Emission Rate (lb/hr)	Concentration (ppb)		Emission Rate (lb/hr)	
Hydrogen Sulfide		40200	3.53E-01	<	500	< 2.91E-02	> 91.76
Benzene		258	5.18E-03	<	1.5	< 1.99E-04	> 96.15
Benzychloride	<	40	< 1.31E-03	<	0.8	< 1.73E-04	NA
Chlorobenzene		65	1.90E-03	<	0.2	< 3.85E-05	> 97.97
Dichlorobenzenes		176	6.66E-03	<	1.1	< 2.76E-04	> 95.86
1,1-dichloroethane	<	30	< 7.64E-04	<	0.3	< 5.06E-05	NA
1,2-dichloroethane	<	20	< 5.10E-04	<	0.3	< 5.06E-05	NA
1,1-dichloroethylene	<	30	< 7.49E-04	<	0.3	< 4.96E-05	NA
Dichloromethane	<	30	< 6.56E-04		0.35	5.07E-05	NA
1,2-dibromoethane	<	30	< 1.45E-03	<	0.3	< 9.61E-05	NA
Perchloroethene		83	5.07E-03	<	0.2	< 8.08E-05	> 98.41
Carbon tetrachloride	<	30	< 1.19E-03	<	0.2	< 5.25E-05	NA
Toluene		690	1.63E-02		0.90	1.41E-04	99.14
1,1,1-trichloroethane	<	20	< 6.85E-04	<	0.2	< 4.53E-05	NA
Trichloroethene		142	1.29E-03	<	0.2	< 4.47E-05	> 96.54
Chloroform	<	20	< 6.12E-04	<	0.2	< 4.06E-05	NA
Vinyl Chloride		191	3.07E-03	<	0.3	< 3.20E-05	> 98.96
m xylenes		1220	3.33E-02		0.67	1.21E-04	99.64
o+p xylene		602	1.64E-02	<	0.3	< 5.42E-05	> 99.67
TNMHC		2173168	8.95E+00		2972	8.10E-02	99.09

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.
NA--Not applicable: Destruction efficiency cannot be calculated since both inlet and outlet values are below the detection limit.

APPENDIX A - Sampling and Analytical Methods

Method:	**Stack Gas Velocity and Volumetric Flow Rate From Small Stacks or Ducts**
Applicable for Methods:	SCAQMD Method 2.3
Principle:	The average gas velocity in a stack gas is determined from the gas density and from measurement of the average velocity head with a standard pitot tube.
Sampling Procedure:	The velocity head and temperature is measured at the traverse points specified by SCAQMD Method 1.2. The static pressure in the stack and the atmospheric pressure is determined. The stack gas molecular weight is determined from independent measurements of O_2, CO_2 and H_2O concentrations.
Sample Recovery: and Analyses:	The stack gas velocity is determined from the measured average velocity head, the measured dry concentrations of O_2 and CO_2 and the measured concentration of H_2O. The velocity is determined from the following set of equations:

Where,

ΔP = velocity head, inches in H_2O
Ts = gas/temperature, degrees R
Ps = absolute static pressure
Mwd = dry molecular weight
Mw = molecular weight
Cp = pitot flow coefficient

Dry molecular weight of stack gas

$$Mwd = 0.44\ (\%CO_2) + 0.32\ (\%O_2) + 0.28\ (\%N_2 + \%CO)$$

Molecular weight of stack gas, wet basis

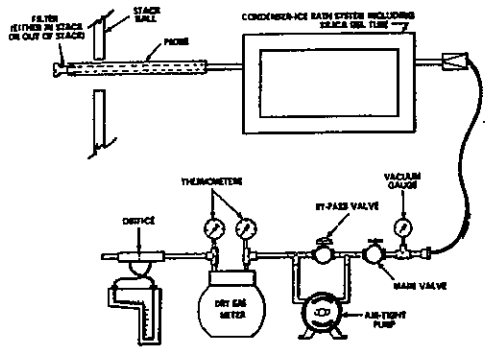
$$M_w = (M_{wd} \times M_d) + 18\ (1 - M_d)$$

$$Where,\ M_d = \frac{100 - Bws}{100}$$

Stack gas velocity

$$(V_s)\ avg. = (5130)\ C_p \times \sqrt{\Delta P}\ avg. \times \sqrt{T_s} \times \left(\frac{1}{P_s \times M_w}\right)^{1/2}$$

Method:	**Determination of Moisture in Stack Gases**
Applicable for Methods:	EPA Method 4, ARB 1-4, SCAQMD Method 4.1
Principle:	A gas sample is extracted at a constant rate from the source; moisture is removed from the stream and determined either volumetrically or gravimetrically.
Sampling Procedure:	Set up train as shown in the following figure. Sample is drawn at a constant rate through a sufficiently heated probe. The probe is connected to the impinger train by Teflon or glass tubing. The train consists of two greenburg smith impinger (SCAQMD 4.1) or one modified and 1 greenburg smith impinger (CARB & EPA) each containing 100 ml of water, an empty impinger as a knock-out and an impinger containing silica gel to protect the pump from moisture.



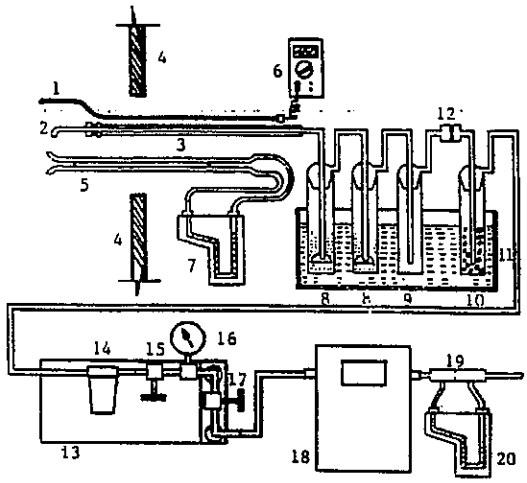
Sample Recovery: and Analyses:	Following testing, moisture content is determined gravimetrically or volumetrically from initial and final impinger contents weights or volume.

Method: **Determination of Particulate Matter Emissions From Stationary Sources Using a Wet Impingement Train**

Reference: SCAQMD Method 5.1

Principle: Stack gas is withdrawn isokinetically from the source through a sample train. Particulate matter is collected in impingers containing deionized water and on a back-up filter. The impingers are contained in an ice bath to maintain a sampled gas temperature of approximately 15° C (60° F). The filter is not heated.

Sampling Procedure: The sampling train is shown in the figure below. The sample is drawn isokinetically through a glass or quartz probe (hi-temp). The probe is connected to an impinger train by Teflon tubing. The train consists of two Greenburg-Smith impingers which contain 100 ml of DI water; an empty impinger as a knock-out; and an impinger containing silica gel to protect the pump from moisture. Sample is withdrawn isokinetically from each predetermined sample point (determined using SCAQMD Method 1.1) through the sample train, which is followed by a vacuum line, a pump, a dry gas meter and a calibrated orifice.



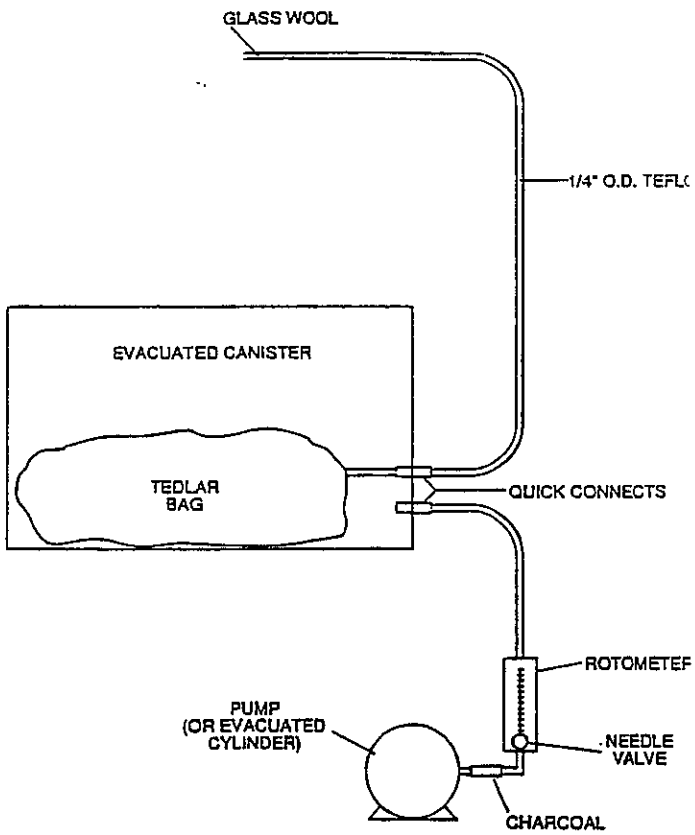
1. Temperature Sensor
2. Nozzle
3. Glass Lined Stainless Steel Probe
4. S-type Pitot Tube
5. Stack Wall
6. Temperature Sensor Meter
7. Pitot Tube Inclined Manometer
8. Impinger with 100 ml H_2O
9. Empty Bubbler
10. Bubbler with Silica Gel
11. Ice Bath
12. Filter
13. Sealed Pump (Leak Free)
14. Filter for Pump
15. Metering Valve
16. Vacuum Gauge
17. By-pass Valve
18. Temperature Compensated Dry Gas Meter
19. Orifice

Sample Recovery: The moisture content is determined either gravimetrically or volumetrically from initial and final impinger weights or volume. Then the filter, probe/impinger rinse (including nozzle rinse, liner rinse, impinger contents and rinses) and silica gel are recovered into Containers #1, #2 and #3, respectively.

Analytical Procedure: The aqueous sample is filtered through a tared fiberglass filter. An organic extraction is performed on the resulting solution using methylene chloride. Both the extraction filter and sample train filter are desiccated then measured gravimetrically. The organic extract and aqueous catch are evaporated, desiccated and measured gravimetrically.

If significant levels of sulfur compounds are present in the stack, each sample fraction is analyzed by acid-base titration for acid sulfate content and by barium-thorin titration for sulfate content.

Method:	**Carbon Monoxide by SCAQMD Micro Total Carbon Analyses**
Reference:	SCAQMD Method 10.1 (Tedlar Bag)
Principle:	A Tedlar bag is filled with flue gas at a constant rate. The bag contents are analyzed by total combustion analyses/flame ionization detection for carbon monoxide.
Sampling Procedure:	A gas sample is collected by evacuating the canister, see figure, at a constant rate over each test run using a rotameter/needle valve and a diaphragm pump. This causes the Tedlar bag to fill with stack gas at a constant rate while maintaining sample integrity. Prior to each sampling run, the evacuated canister (containing the Tedlar bag) is leak checked at 2" Hg vacuum. The sample train upstream of the Tedlar bag is then purged with stack gas. At the conclusion of each test run, each Tedlar bag sample is sealed and stored in an opaque container pending analysis.
Analytical Procedure:	Carbon monoxide concentration from the sample is determined using the SCAQMD Total Combustion Analysis (TCA) procedure.



Method:	**Determination of Total Gaseous Non-Methane Organic Emissions as Carbon**
Reference:	SCAQMD Method 25.1
Principle:	A sample of flue gas is drawn through a condensate trap and into an evacuated 12 liter tank. Volatile organic compounds (VOC), as total gaseous non-methane organics (TGNMO), are determined by combining results from independent analysis of condensate in the traps and gases in the tanks.
Sampling Procedure:	Duplicate gas samples are withdrawn from a source at a constant rate through condensate traps immersed in dry ice followed by evacuated 12 liter (nominal) tanks. Heavy organic components condense as liquids and solids in the condensate traps. Lighter components pass as gases through the traps into the tanks. The combined results from tanks and trap analyses are used to determine a qualitative and quantitative expression of the effluent gas stream. Duplicate sampling is designed into the system to demonstrate precision. The sampling apparatus is checked for leaks prior to the sampling program by attaching the probe end to an absolute pressure gauge and vacuum pump in series. The sample lines were evacuated to less than 10 mm Hg and the gauge shutoff valve is then closed. The sample lines are deemed to be leak-free if no loss of vacuum occurs as indicated by the vacuum gauge. During sampling the tank pressures are monitored with a 0-30 inch vacuum gauge to ensure integrated sampling. The final vacuum of each sample is measured using a slack tube manometer. The sample is then pressurized to 800 mm Hg absolute with ultrapure nitrogen. Each sample is then analyzed using the SCAQMD TCA procedure for total non methane hydrocarbons.
Analytical Procedure:	Condensate traps are analyzed by first stripping carbon dioxide (CO_2) from the trap. The organic contents are then removed and oxidized to CO_2. This CO_2 is quantitatively collected in an evacuated vessel and measured by injection into a flame ionization detection/total combustion analysis (FID/TCA) system. The organic content of the sample fraction collected in each tank is measured by injecting a portion into the FID/TCA analysis system which uses a two phase gas chromatography (GC) column to separate carbon monoxide (CO), methane (CH_4) and carbon dioxide (CO_2) from each other and from the total gaseous non-methane organics (TGNMO) which are eluted as backflush. All eluted components are first oxidized to CO_2 by a hopcalite catalyst and then reduced to methane by a nickel catalyst. The resulting methane is detected using the flame ionization detector. A gas standard containing CO, CH_4, CO_2 and propane, traceable to NBS, is used to calibrated the FID/TCA analysis system.

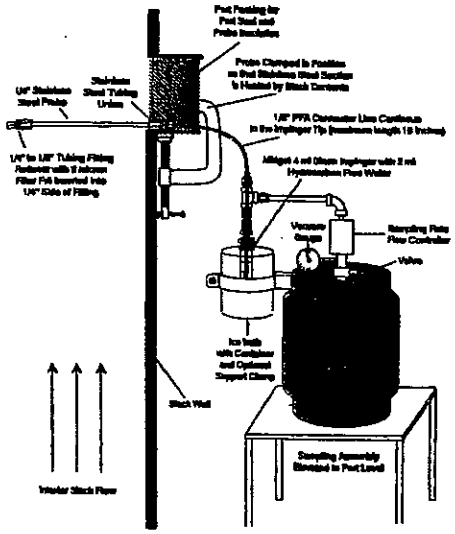
Method: **Determination of Total Gaseous Non-Methane Organic Emissions as Carbon**

Reference: SCAQMD Method 25.3

Principle: A sample of flue gas is drawn through a condensate trap (mini-impinger) and into an evacuated six liter SUMMA canister. Volatile organic compounds (VOC), as total gaseous non-methane organics (TGNMO), are determined by combining results from independent analysis of condensate in the traps and gases in the SUMMA canisters.

Sampling Procedure: Duplicate gas samples are withdrawn from a source at a constant rate through condensate traps immersed in an ice bath followed by evacuated six liter (nominal) SUMMA canisters. Heavy organic components condense as liquids and solids in the condensate traps. Lighter components pass as gases through the traps into the canisters. The combined results from canisters and mini-impinger analyses are used to determine a qualitative and quantitative expression of the effluent gas stream. Duplicate sampling is designed into the system to demonstrate precision.

The sampling apparatus is checked for leaks prior to the sampling program by capping the end of the sample probe. The sample flow valve is then opened and then closed to introduce vacuum to the system. The vacuum drop should then cease numerically above 10 in. Hg. A cease in movement of the vacuum gauge for a period of ten minutes indicates an acceptable leak check. When sampling is initiated, the vacuum gauge must indicate a canister vacuum of greater than 28 in. Hg. Immediately after sampling a post-test leak check is performed, followed by a rinse of the PFA line into the condensate trap with 0.5 to 1.0 ml of hydrocarbon free water.



Analytical Procedure: Condensate traps are analyzed for total organic carbon by liquid injection into an infrared total organic carbon analyzer.

The organic content of the sample fraction collected in each canister is measured by injecting a portion into the FID/TCA analysis system which uses a two phase gas chromatography (GC) column to separate carbon monoxide (CO), methane (CH_4) and carbon dioxide (CO_2) from each other and from the total gaseous non-methane organics (TGNMO) which are eluted as backflush. All eluted components are first oxidized to CO_2 by a hopcalite catalyst and then reduced to methane by a nickel catalyst. The resulting methane is detected using the flame ionization detector. A gas standard containing CO, CH_4, CO_2 and propane, traceable to NBS, is used to calibrated the FID/TCA analysis system.

CONTINUOUS EMISSIONS MONITORING SYSTEM - TRUCK

SCAQMD Method 100.1

The continuous emissions monitoring system consists of a Thermo Electron Model 10AR chemiluminescence NO/NO_x analyzer, a Teledyne electro chemical O_2 analyzer, a Thermo Electron Model 48H CO gas filter correlation analyzer and a Horiba PIR 2000 non dispersive infrared CO_2 analyzer. All analyzer specifications are provided in Table 1. All concentrations are determined on a dry basis. Concentrations of NO_X, CO, O_2 and CO_2 are continuously recorded on a Linseis 10-inch strip chart recorder and a Strawberry Tree Data Acquisition System (DAS). The extractive monitoring system conforms with the requirements of SCAQMD Method 100.1.

The sampling probe (heated to 250°F), constructed of 1/2 inch-diameter 316 stainless steel, is connected to a condenser with a six foot length of 3/8 inch Teflon line (heated to 250°F). A Nupro stainless steel filter (10 micron) is connected at the tip of the probe and maintained at stack temperature.

The condenser consists of a series of two stainless steel moisture knock-out bottles immersed in an ice water bath. The system is designed to minimize contact between the sample and the condensate. Condensate is continuously removed from the knock-out bottles via a peristaltic pump. The condenser outlet temperature is monitored either manually at 10-minute intervals or on a strip chart recorder/DAS system. The sample exiting the condenser is then transported through a filter, housed in a stainless steel holder, followed by 3/8 inch O.D. Teflon tubing and a Teflon coated (or stainless steel/viton) diaphragm pump to the sample manifold. The sample manifold is constructed of stainless steel tubing and directs the sample through each of five rotameters to the NO_X monitor, O_2 monitor, CO monitor, CO_2 monitor and excess sample exhaust line, respectively. Sample flow through each channel is controlled by a back pressure regulator and by stainless steel needle valves on each rotameter. All components of the sampling system that contact the sample are composed of stainless steel, Teflon or glass.

The calibration system is comprised of two parts: the analyzer calibration and the system bias check. The calibration gases are, at a minimum, certified to $\pm 1\%$ by the manufacturer. Where necessary to comply with the reference method requirements, EPA Protocol 1 gases are used. The cylinders are equipped with pressure regulators which supply the calibration gas to the analyzers at the same pressure and flow rate as the sample. The selection of zero, span or sample gas directed to each analyzer is accomplished by operation of the zero, calibration or sample selector knobs located on the main flow control panel.

For SCAQMD Method 100.1 testing, the following procedures are conducted before and after each series of test runs:

Leak Check:

The leak check is performed by plugging the end of the sampling probe, evacuating the system to at least 20 inches of Hg. The leak check is deemed satisfactory if the system holds 20 inches of Hg vacuum for five minutes with less than one inch Hg loss.

Linearity Check:

The NO_X, CO, CO_2 and O_2 analyzers linearity check is performed by introducing, at a minimum, zero gas, mid range calibration gas (40-60% scale) and high range calibration gas (80-100% scale). Instrument span value is set on each instrument with the mid range gas. The high range calibration gas (80-100% scale) is then introduced into each instrument without any calibration adjustments. Linearity is confirmed, if all values agree with the calibration gas value to within 2% of the range.

Stratification Check:

A stack stratification check is performed (pre-test only) by traversing the stack with the appropriate number of traverse alternately with the reference point (center). If the gas composition is homogenous, $<10\%$ variation between any traverse points in the gas stream and the normalized average point, single point gas sampling is performed at the reference point. If stratification exceeds the 10% criteria, then the stack cross section is traversed during sampling.

System Bias Check:

The system bias check is accomplished by transporting the same gases used to zero and span the analyzers to the sample system as close as practical to the probe inlet. This is accomplished by opening a valve located on the probe, allowing the gas to flow to the probe and back through the moisture knockout and sample line to the analyzers. During this check the system is operated at the normal sampling rate with no adjustments. The system bias check is considered valid if the difference between the gas concentration exhibited by the measurement system which a known concentration gas is introduced at the sampling probe tip and when the sample gas is introduced directly to the analyzer, does not exceed ± 5% of the analyzer range.

Response Time:

Response time (upscale and downscale) for each analyzer is recorded during the system bias check. Upscale response time is defined as the time it takes the subject analyzer gas to reach 95% of the calibration gas value after introducing the upscale gas to the sample bias calibration system. Downscale response time is defined as the time it takes the subject analyzer to return to zero after the zero gas is introduced into the sample system bias calibration system.

NO_x Conversion Efficiency

The NO_x analyzer NO_2 conversion efficiency is determined by injecting a NO_2 gas standard directly into the NO_x analyzer (after initial calibration). The analyzer response must be a least 90% of the NO_2 standard gas value.

NO_2 Converter Efficiency (alternate method)

The mid level NO gas standard is directly injected into a clean leak-free Tedlar bag. The bag is then diluted 1:1 with air (20.9 % O_2). The bag is immediately attached to the NO sample line. The initial NO_x concentration is recorded on the strip chart. After at least 30 minutes the Tedlar bag is reattached to the NO_x sample line. Analyzer response must be at 98% of the initial Tedlar bag NO_x value to be acceptable.

In between each sampling run the following procedures are conducted:

Zero and Calibration Drift Check:

Upon the completion of each test run, the zero and calibration drift check is performed by introducing zero and mid range calibration gases to the instruments, with no adjustments (with the exception of flow to instruments) after each test run. The analyzer response must be within ± 3% of the actual calibration gas value.

Analyzer Calibration:

Upon completion of the drift test, the analyzer calibration is performed by introducing the zero and mid range gases to each analyzer prior to the upcoming test run and adjusting the instrument calibration as necessary.

System Bias Check

(same as above)

A schematic of the sample system and specific information of the analytical equipment is provided in the following pages.

TABLE 1

CONTINUOUS EMISSIONS MONITORING LABORATORY - TRUCK

NO_X CHEMILUMINESCENT ANALYZER -- THERMO ELECTRON MODEL 10 A

Response Time (0-90%)	1.5 sec -- NO mode/1.7 sec -- NO_x mode
Zero Drift	Negligible after 1/2 hour warmup
Linearity	$\pm$ 1% of full scale
Accuracy	Derived from the NO or NO_2 calibration gas, $\pm$ 1% of full scale
Operating Ranges (ppm)	2.5, 10, 25, 100, 250, 1000, 2500, 10000
Output	0-1 volt

O_2 ANALYZER, FUEL TYPE -- TELEDYNE MODEL 326RA

Response Time (0-90%)	60 seconds
Accuracy	$\pm$ 1% of scale at constant temperature $\pm$ 1% of scale of $\pm$ 5% of reading, whichever is greater, over the operation temperature range.
Operating Ranges (%)	0-5, 0-25
Output	0-1 volt

O_2 ANALYZER, PARAMAGNETIC -- SERVOMEX MODEL 1400B

Response Time (0-90%)	15 seconds
Accuracy	0.1% oxygen
Linearity	$\pm$ 1% scale
Operating Ranges (%)	0-25, 0-100
Output	0-1 volt

CO GAS FILTER CORRELATION -- THERMO ELECTRON MODEL 48H

Response Time (0-95%)	1 minute
Zero Drift	$\pm$ 0.2 ppm CO
Span Drift	Less than 1% full scale in 24 hours
Linearity	$\pm$ 1% full scale, all ranges
Accuracy	$\pm$ 0.1 ppm CO
Operating Ranges (ppm)	50, 100, 250, 500, 1000, 2500, 5000, 10,000, 25,000, 50,000
Output	0-1 volt

CO_2 INFRARED GAS ANALYZER -- HORIBA - MODEL PIR 2000

Response Time (0-90%)	5 seconds
Zero Drift	± 1% of full scale in 24 hours
Span Drift	± 1% of full scale in 24 hours
Linearity	± 2% of full scale
Resolution	Less than 1% of full scale
Operating Ranges (%)	0-5, 0-15, 0-25
Output	0-1 volt

SO_2 PULSED FLOURESCENT - TECO - MODEL 43C-HL

Response Time	80 seconds
Zero Drift	± 1%
Span Drift	± 1%
Linearity	± 1%
Resolution	± 1%
Operating Ranges	5, 10, 20, 50, 100, 200, 500, 1000, 2000, 5000
Output	0-10 volt

RATFISCH FID TOTAL HYDROCARBON ANALYZER -- MODEL 55CA

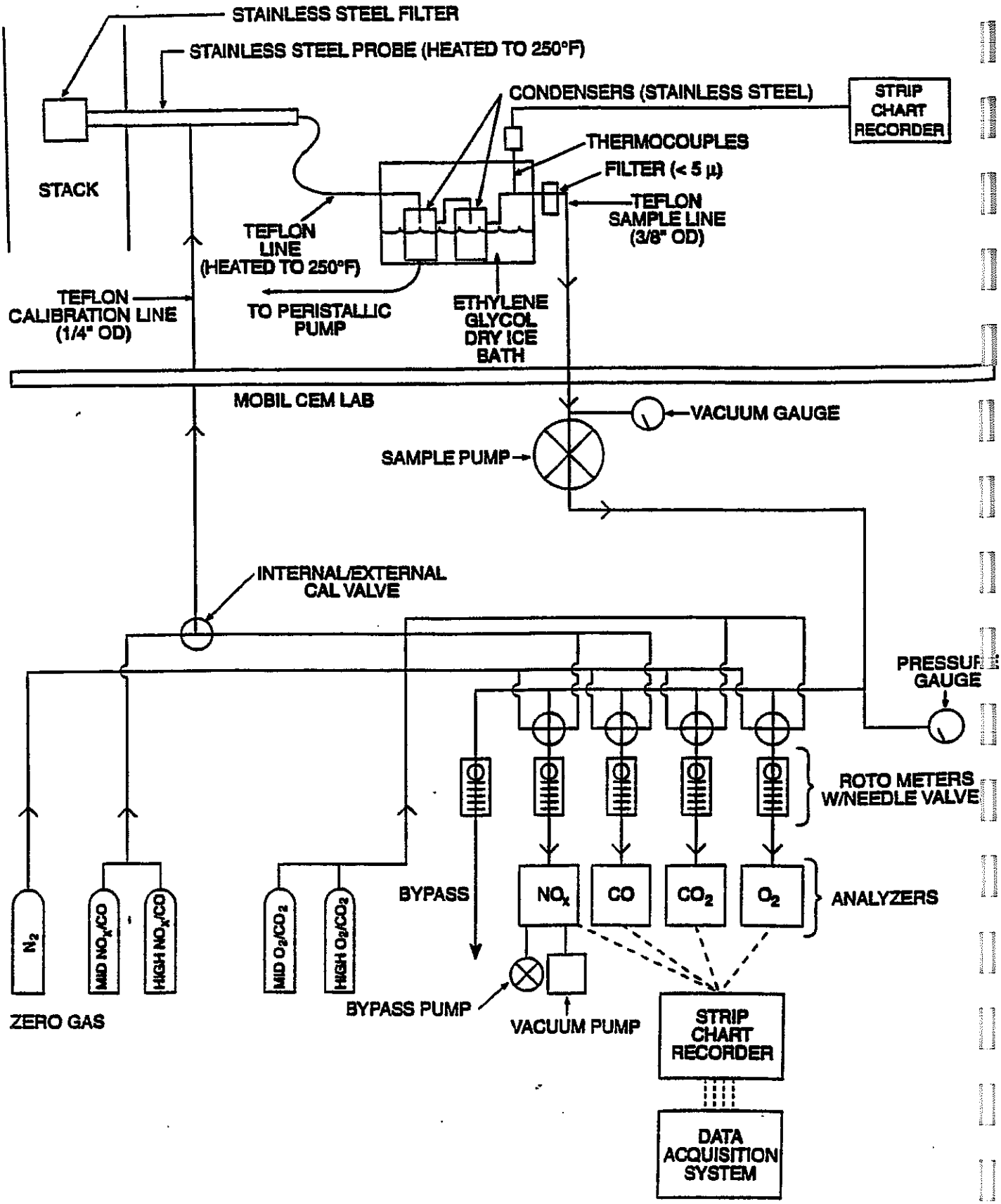
Response Time (0-90%)	5 seconds
Zero Drift	± 1% full scale in 24 hours
Span Drift	± 1% full scale in 24 hours
Linearity	± 1% full scale - constant
Accuracy	± 1% full scale at constant temp.
Operating Ranges (ppm)	10, 100, 1000, 10,000
Output	0 - 10 volts

LINSEIS MODEL L2045 FOUR PEN STRIP CHART RECORDER

Pen Speed	up to 120 cm/min
Measuring Response	0-20 volts
Linearity Error	0.25%
Accuracy	0.3%
Zero Suppression	Manual (from 1 to 10X full scale)

LINEAR 3 PEN CONTINUOUS -- MODEL 595 STRIP CHART

Pen Response	20 inches/second
Measuring Response	1 Mv through 5V
Zero Set	Electronically adjustable full scale with 1 full scale of zero suppression
Accuracy	Total limit of error ± 0.5%


STAINLESS STEEL FILTER
STAINLESS STEEL PROBE (HEATED TO 250°F)
CONDENSERS (STAINLESS STEEL)
STRIP CHART RECORDER
THERMOCOUPLES
FILTER (< 5 µ)
STACK
TEFLON SAMPLE LINE (3/8" OD)
TEFLON LINE (HEATED TO 250°F)
TEFLON CALIBRATION LINE (1/4" OD)
TO PERISTALLIC PUMP
ETHYLENE GLYCOL DRY ICE BATH
MOBIL CEM LAB
VACUUM GAUGE
SAMPLE PUMP
INTERNAL/EXTERNAL CAL VALVE
PRESSURE GAUGE
ROTO METERS W/NEEDLE VALVE
BYPASS
NO_x
CO
CO_2
O_2
ANALYZERS
N_2
MID NO_x/CO
HIGH NO_x/CO
MID O_2/CO_2
HIGH O_2/CO_2
ZERO GAS
BYPASS PUMP
VACUUM PUMP
STRIP CHART RECORDER
DATA ACQUISITION SYSTEM

Method:	**NO/NO_X by Continuous Analyzer**
Applicable Reference Methods:	EPA 7E, EPA 20; CARB 100, BAAQMD ST-13A, SCAQMD 100.1
Principle:	A sample is continuously withdrawn from the flue gas stream, conditioned and conveyed to the instrument for direct readout of NO or NO_X.
Analyzer:	TECO Model 10AR
Measurement Principle:	Chemiluminescence
Accuracy:	1% of full scale
Ranges:	0-2.5, 0-10, 0-25, 0-100, 0-250, 0-1000, 0-2500, 0-10,000 ppm
Output:	0-10 V
Inferences:	Compounds containing nitrogen (other than ammonia) may cause interference.
Response Time:	90%, 1.5 seconds (NO mode) and 1.7 seconds (NO_X mode)
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously. If EPA Method 20 is used, that method's specific procedures for selecting sample points are used.
Analytical Procedure:	The oxides of nitrogen monitoring instrument is a chemiluminescent nitric oxide analyzer. the operational basis of the instrument is the chemiluminescent reaction of NO and ozone (O_3) to form NO_2 in an excited state. Light emission results chemiluminescence is monitored through an optical filter by a high sensitivity photomultiplier tube, the output of which is electronically processed so it is linearly proportional to the NO concentration. The output of the instrument is in ppmV. When NO_2 is expected to be present in the flue gas, a supercooled water dropout flask will be placed in the sample line to avoid loss of NO_2. Since NO_2 is highly soluble in water, "freezing out" the water will allow the NO_2 to reach the analyzers for analysis. The analyzer measures NO only. In the NO_X mode, the gas is passed through a moly converter which converts NO_2 to NO and a total NO_X measurement is obtained. NO_2 is determined as the difference between NO and NO_X. Use of a moly converter instead of a stainless steel converter eliminates NH_3 interference; NH_3 is converted to NO with a stainless converter, but not with a moly converter.

Method:	**Oxygen (O_2) by Continuous Analyzer**
Applicable Reference Methods:	EPA 3A, EPA 20, CARB 100, BAAQMD ST-14, SCAQMD 100.1
Principle:	A sample is continuously withdrawn from the flue gas stream, conditioned and conveyed to the instrument for direct readout of O_2 concentration.
Analyzer:	Teledyne Model 326R
Measurement Principle:	Electrochemical cell
Ranges:	0-5, 0-25% 0-100%
Accuracy:	1% of full scale
Output:	0-1 V
Interferences:	Halogens and halogenated compounds will cause a positive interference. Acid gases will consume the fuel cell and cause a slow calibration drift.
Response Time:	90% <60 seconds
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously. If Method 20 is used, that method's specific procedures for selecting sample points are used. Otherwise, stratification checks are performed at the start of a test program to select single or multiple-point sample locations.
Analytical Procedure:	An electrochemical cell is used to measure O_2 concentration. Oxygen in the flue gas diffuses through a Teflon membrane and is reduced on the surface of the cathode. A corresponding oxidation occurs at the anode internally and an electric current is produced that is proportional to the concentration of oxygen. This current is measured and conditioned by the instrument's electronic circuitry to give an output in percent O_2 by volume.

Method:	**Carbon Dioxide (CO_2) by Continuous Analyzer**
Applicable Reference	EPA 3A, CARB 100, BAAQMD ST-5, SCAQMD 100.1
Principle:	A sample is continuously drawn from the flue gas stream, conditioned and conveyed to the instrument for direct readout of CO_2 concentration.
Analyzer:	PIR 2000
Measurement Principle:	Non-dispersive infrared (NDIR)
Accuracy:	1% of full scale
Ranges:	0-5, 0-15%
Output:	0-1 V
Interferences:	A possible interference includes water. Since the instrument receives dried sample gas, this interference is not significant.
Response Time:	5 seconds
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously.
Analytical Procedure:	Carbon dioxide concentrations are measured by short path length non-dispersive infrared analyzers. These instruments measure the differential in infrared energy absorbed from energy beams passed through a reference cell (containing a gas selected to have minimal absorption of infrared energy in the wavelength absorbed by the gas component of interest) and a sample cell through which the sample gas flows continuously. The differential absorption appears as a reading on a scale of 0-100%.

Method:	**Carbon Monoxide (CO) by NDIR/Gas Filter Correlation**
Applicable Reference Methods:	EPA 6C; CARB 1-100; BAAQMD ST-6, SCAQMD 100.1
Principle:	A sample is continuously drawn from the flue gas stream, conditioned and conveyed to the instrument for direct readout of CO concentration.
Analyzer:	TECO, Model 48H
Measurement Principle:	NDIR/Gas Filter Correlation
Precision:	0.1% ppm
Ranges: ppm	0-50, 0-100, 0-250, 0-500, 0-1000, 0-2500, 0-5000, 0-10000, 0-2500, 0-3,000
Output:	0-1 V
Interferences:	Negligible interference from water and CO_2
Rise/Fall times (0-95%)	1 minute @ 1 lpm flow, 30 second integration time
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously. Sample point selection has been described previously.
Analytical Procedure:	Radiation from an infrared source is chopped and then passed through a gas filter which alternates between CO and N_2 due to rotation of a filter wheel. The radiation then passes through a narrow band-pass filter and a multiple optical pass sample cell where absorption by the sample gas occurs. The IR radiation exits the sample cell and falls on a solid state IR detector.

Method:	**Sulfur Dioxide (SO_2) by Pulsed Flourescent**
Applicable Reference Methods:	EPA 10; CARB 1-100; BAAQMD ST-6, SCAQMD 100.1
Principle:	A sample is continuously drawn from the flue gas stream, conditioned and conveyed to the instrument for direct readout of SO_2 concentration.
Analyzer:	TECO, Model 43C-HL
Measurement Principle:	Pulsed flourescense SO_2 analyzer
Precision:	0.1% ppm
Ranges:	5, 10, 20, 50, 100, 200 ppm
Output:	0-10 V
Interferences:	Less than lower detectable limit except for the following: NO <3 ppb, m-xylene <2 ppm, H_2O <2% of reading.
Response Time:	80 seconds
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously. Sample point selection has been described previously.
Analytical Procedure:	The sample flows into the flourescent chamber, where pulsating UV light excites the SO_2 molecules. The condensing lens focuses the pulsating UV light into the mirror assembly. The mirror assembly contains four selecting mirrors that reflect only the wavelengths which excite SO_2 molecules. As excited SO_2 molecules decay to lower energy states they emit UV light that is proportional to the SO_2 concentration. The PMT (photomultiplier tube) detects UV light emission from decaying SO_2 molecules. The PMT continuously monitors pulsating UV light source and is connected to a circuit that compensates for fluctuating in the light.

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environmental consultants
laboratory services

Tandem Gas Chromatographic/Mass Spectroscopic-Electrolytic Conductivity Detector (GC/MS-ELCD) Method for Determination of Total Sulfur in Gas Samples

AtmAA, Inc.
03-060

3/30/93

This method measures selected reduced sulfur species, including but not limited to hydrogen sulfide, carbonyl sulfide, methyl mercaptan, ethyl mercaptan, dimethyl sulfide, carbon disulfide, isopropyl mercaptan, n-propyl mercaptan, and dimethyl disulfide in gaseous sample matrices using gas chromatographic separation and a mass spectrometric and electrolytic conductivity detector (ELCD), where the ELCD measures hydrogen sulfide only. A non-polar methyl silicon capillary gas chromatographic column is used for component separation and selected ion monitoring is used for component quantification. Component quantification is obtained using a multi-component external standard prepared by Scott Specialty Gases. The lower detection limit varies by component but is at least 0.1 ppmv ethyl mercaptan (component of lowest sensitivity) for a 0.31 ml sample volume injection. The upper quantitation limit has not been determined but is at least beyond 80 ppmv dimethyl disulfide, for which response remained linear from 0.1 ppmv to 80 ppmv.

Hydrogen sulfide is measured using an electrolytic conductivity detector operated in the oxidative sulfur mode. A Chromosil 310 column, operated isothermally at 45°C. is used to separate H_2S from other sulfur components. A fixed volume loop injection is used in the analysis for H_2S.

Lower Detection Limits (LDL's):

Using a 1 ml injection volume for H_2S by electrolytic conductivity detector and 0.40 ml injection volume for GC/MS measured sulfur compounds, the following LDL's are obtained:

	(ppmv)
Hydrogen sulfide	0.5
Carbonyl sulfide	0.03
Methyl mercaptan	0.03
Ethyl mercaptan	0.04
Dimethyl sulfide	0.02
Carbon disulfide	0.02
i-propyl mercaptan	0.03
n-propyl mercaptan	0.03
Dimethyl disulfide	0.02

Equipment:

A Hewlett-Packard 5890 series II gas chromatograph (GC), Hewlett-Packard 5971A Mass Selective Detector, 486 MS/DOS computer and HP operating software are used for all sulfur species except H_2S. The GC is fitted with a heated 6-port Valco 1/16" line, sample injection valve. All gas transfer lines to the sample loop are fused silica lined Restek tubing. The fixed volume (0.40 ml) sample loop is Teflon. The transfer line from the valve to the GC column is cleaned and treated blank 0.53 mm OD fused silica line with polyimide coating.

H_2S is measured using a Varian 1400 GC with the Hall oxidative quartz tube furnace and electrolytic cell attached. Nitrogen is used as carrier and oxygen is used as the combustion gas.

Multi-component gaseous standards are prepared by Scott Specialty Gas and are contained in two separate aluminum cylinders and a Scotty IV canister as follows:

Cylinder A (CAL12250)

Carbonyl sulfide	15.2 ppmv
Ethyl mercaptan	13.4 ppmv
Carbon disulfide	16.1 ppmv

Cylinder B (CAL3563)

Hydrogen sulfide	12.3 ppmv
Methyl mercaptan	22.6 ppmv
Dimethyl sulfide	20.3 ppmv
Dimethyl disulfide	

Scotty IV (mix 252)

Hydrogen Sulfide 93.8 ppmv

Gas tight clean glass volumetric syringes of 10, 20, & 50 ml capacity, with smooth glass barrel (not sintered glass) are used to make volumetric dilutions of sample or standard.

GC/MS SIM parameters:

	Dwell per ion	start time	Ions
Group 1:	75 msec.	8.0 min.	60
Group 2:	75 msec.	10.0 min.	47,48,64
Group 3:	75 msec.	14.5 min.	47,62,76,78,43,61
Group 4:	75 msec.	19.5 min.	79,94,122,142,156, 128

Components monitored:

Group 1: carbonyl sulfide
Group 2: methyl mercaptan
Group 3: ethyl mercaptan, dimethyl ~~di~~sulfide, carbon disulfide, isopropyl mercaptan, n-propyl mercaptan
Group 4: dimethyl sulfide

Component	Quantitation ion	Confirmation ion
carbonyl sulfide	60	none
methyl mercaptan	47	48
ethyl mercaptan	62	47
dimethyl sulfide	62	47
carbon disulfide	76	78
iso-propyl mercaptan	76	43,47,61
n-propyl mercaptan	76	43,47,61
dimethyl disulfide	94	79

Sulfur dioxide is analyzed by monitoring mass 64 which is included in Group 2 ions.

Calibration:

Gaseous standards can be analyzed prior to or after a set of samples. Response factors are determined from a single point standard calibration. Multi-point calibrations are performed to verify linearity. Consistency of standard response with continuing calibrations is observed to indicate performance of multi-point calibration.

Samples containing components at less than the stated LDL can be analyzed by cryogenically focusing a measured volume of gaseous sample onto a glass bead filled Teflon loop immersed in liquid argon. The sample is thermally transferred upon injection by immersing the sample loop in near boiling temperature water. The LDL obtained by this technique is calculated as:

$$LDL_{cryo} = (\text{cryo volume}/0.40)*LDL_{0.40}$$

Acceptable volumes for cryogenic concentration range from 3 to 100 ml. and are determined based on amounts of other components in the sample such as water, carbon dioxide or hydrocarbons.

Procedure:

A volumetric sample of landfill or source collected gas is transferred from a Tedlar® bag to the 6-port valve injection line using a glass syringe of approximately 10 ml. A Teflon loop of 0.40 ml volume is used to inject the sample. When sample concentrations exceed that of the standard, appropriate volumetric sample dilutions are made using the glass syringes with dry nitrogen diluent. Immediately after sample injection, the GC/MS is started. Standards are analyzed in the same manner as samples. Appropriate component peaks are monitored and integrated after sample analysis data set has been obtained.

Hydrogen sulfide is measured using the electrolytic conductivity detector by a separate direct fixed loop valve injection using heated Teflon loop, transfer lines, and Teflon Chromosil 310 GC column.

A response factor for a standard component is calculated as:

rf = std. amt. / std. area

Sample concentration is calculated using the response factor:

conc. = rf x sample area

At least 10% of samples in a sample set, or minimum of one sample per set are analyzed twice to determine precision. A separate report showing repeat analyses results is included with an analytical report of sulfur component concentrations per each sample set. Repeat analyses must agree within +/- 10% except for component concentrations less than 1 ppmv. A nitrogen blank is analyzed between standards and samples to verify that there is no component carry-over. Samples are analyzed as soon after they are ived as possible, preferably same day and within four hours of ection. Data is being gathered to determine stability of sulfur compounds in Tedlar® bag containers in an effort to extend sample holding time. Samples are usually analyzed before standards to prevent carry-over, since most sulfur components measured in landfill gas samples are lower in concentration than those in the standards.

GC/MS Analysis Conditions:

GC conditions: a 30 M x 0.2 mm, 0.50 um film methyl silicon PONA column from Hewlett-Packard is temperature programmed as follows:

-65 degrees C, hold min.
15 degrees C min. to 220 degrees C, hold 5 min.

Valve oven Temp. 150 degrees C
GC/MS transfer line 180 degrees C
Carrier gas is helium, pressure regulated at 21 psi.

MS Conditions:

MS calibration is performed periodically prior to performing analyses using PFTBA (perfluoro-tributylamine) as supplied by Hewlett-Packard and as controlled by HP software under the mid-range auto tine program.
Solvent delay = 8 min.

Hall Detector/GC Analysis Conditions:

6' x 1/8" Teflon, Chromosil 310 analytical column
45 degrees C, isothermal
Valve oven & transfer line Temp. 105 degrees C.
Carrier gas is nitrogen, flow rate 18 cc/min.
Oxygen oxidation gas, flow rate 18 cc/min.
Quartz tube oxidation oven Temp. 650 degrees C.

APPENDIX B - Computer Printout of Results

SCAQMD Method 100.1 Emission Rates

Facility: **Bradley Landfill**
Source: **Flare #2**
Job No.: **W07-042**
Date: **4/20/2005**

Run Number	******		1		2
Load	******		as Found		as Found
EPA F-Factor	dscf/MMBtu		10308		10308
Stack Flow Rate	dscfm		10716		10846
Oxygen	%		9.35		9.34
Carbon Dioxide	%		10.75		10.61
Oxides of Nitrogen					
Concentration	ppm		20.2		19.5
Concentration @ 3 % O2	ppm		31.3		30.2
Concentration	lb/dscf		2.45E-06		2.37E-06
Emission Rate	lb/MMBtu		4.56E-02		4.41E-02
Emission Rate	lb/hr		1.573		1.540
Carbon Monoxide					
Concentration	ppm	<	20.0	<	20.0
Concentration @ 3 % O2	ppm	<	31.0	<	31.0
Concentration	lb/dscf	<	1.48E-06	<	1.48E-06
Emission Rate	lb/MMBtu	<	2.75E-02	<	2.75E-02
Emission Rate	lb/hr	<	0.949	<	0.960

SCAQMD Methods 1-4 Flowrate Determination

Facility: **Bradley Landfill**
Source: **Flare #2**
Job No.: **W07-042**
Date: **4/20/2005**

STANDARD TEMPERATURE	Degrees F	60	60	60
RUN NUMBER	******	1	2	Average
CLOCK TIME: INITIAL	******	743	924	
CLOCK TIME: FINAL	******	843	1025	
AVG. STACK TEMPERATURE	Degrees F	117	125	121
AVG. SQUARE DELTA P	Inches H20	0.8338	0.8423	0.8381
BAROMETRIC PRESSURE	Inches HG	29.07	29.07	29.07
SAMPLING TIME	Minutes	60	60	60
SAMPLE VOLUME	Cubic Feet	45.615	45.240	45.428
AVG. METER TEMP.	Degrees F	77.5	83.8	80.7
AVG. DELTA H	Inches H20	1.60	1.60	1.60
DGM CALIB. FACTOR [Y]	******	1.0076	1.0076	1.0076
WATER COLLECTED	Milliliters	54	42	48
CO 2	Percent	30.2	30.2	30.2
O 2	Percent	2.2	2.2	2.2
CO	Percent	0.0	0.0	0.0
CH4	Percent	35.2	35.2	35.2
N 2	Percent	32.5	32.5	32.5
STACK AREA	Square Inches	78.54	78.54	78.54
STATIC PRESSURE	Inches WG	6.00	6.00	6.00
PITOT COEFFICIENT	******	0.99	0.99	0.99
SAMPLE VOLUME DRY	DSCF	43.38	42.52	42.95
WATER AT STD.	SCF	2.5	2.0	2.3
MOISTURE	Percent	5.5	4.4	5.0
MOLE FRACTION DRY GAS	******	0.94	0.96	0.95
MOLECULAR WT.DRY	lb/lb Mole	28.69	28.69	28.69
EXCESS AIR	Percent	34	34	34
MOLECULAR WT. WET	lb/lb Mole	28.10	28.21	28.15
STACK GAS PRESSURE	Inches HG	29.51	29.51	29.51
STACK VELOCITY	AFPM	3534	3586	3560
VOLUMETRIC FLOWRATE, DRY STD.	DSCFM	1617	1638	1628
VOLUMETRIC FLOWRATE, ACTUAL	ACFM	1927	1956	1942

EMISSION RATES

SAMPLE A				
TNMHC Concentration, as CH4	ppm	2074		2074
TNMHC Concentration, as CH4	mg/dscf	39.62		39.62
TNMHC Emission Rate, as CH4	lb/hr	8.48		8.53
SAMPLE B				
TNMHC Concentration, as CH4	ppm	2273		2273
TNMHC Concentration, as CH4	mg/dscf	43.43		43.43
TNMHC Emission Rate, as CH4	lb/hr	9.29		9.35
AVERAGE				
TNMHC Concentration, as CH4	ppm	2173		2173
TNMHC Concentration, as CH4	mg/dscf	41.53		41.53
TNMHC Emission Rate, as CH4	lb/hr	8.88		8.94

EXPANSION AND F-FACTOR CALC. METHOD

Client:	Bradley Landfill	Date:	04/20/05
Location:	Sun Valley, CA	Job #:	W07-042
Unit:	Flare #2	Run#:	1

Fuel temperature		deg. F	Std. Temp.	60	deg. F
Fuel Pressure		psi			
Fuel Flow Rate		cfm	Fuel Flow	1617	dscfm
Exhaust Outlet O2	9.35	%			
Barometric Pressure	29.07				

COMPONENTS		MOLE %	HHV btu/ft3	LLV btu/ft3	Exp Factor dscf/scf fuel
Oxygen		2.19			0.022
Nitrogen		32.46			0.325
Carbon Dioxide		30.15			0.302
Methane		35.20	355.52	320.11	3.017
Ethane	C2		0.00	0.00	0.000
Propane	C3		0.00	0.00	0.000
Iso-Butane	C4		0.00	0.00	0.000
N-Butane			0.00	0.00	0.000
Iso-Pentane	C5		0.00	0.00	0.000
N-Pentane			0.00	0.00	0.000
Hexane	C6		0.00	0.00	0.000
Heptane	C7		0.00	0.00	0.000
Octane	C8		0.00	0.00	0.000
Nonane	C9		0.00	0.00	
Total		**100.00**	**355.52**	**320.11**	**3.66**

CALCULATIONS

EXHAUST FLOW RATE, Q = (scfm*Exp Fac)*(20.92(20.92-%O2)

10716 DSCFM

EPA F-Factor = (scf exhaust/scf fuel)/(btu/scf fuel)*(1000000 btu/MMbtu)

10308 dscf/Mmbtu

EXPANSION AND F-FACTOR CALC. METHOD

Client:	Bradley Landfill	Date:	4/20/2005
Location:	Sun Valley, CA	Job #:	W07-042
Unit:	Flare #2	Run#:	2

Fuel temperature		deg. F	Std. Temp.	60	deg. F
Fuel Pressure		psi			
Fuel Flow Rate		cfm	Fuel Flow	1638	dscfm
Exhaust Outlet O2	9.34	%			
Barometric Pressure	29.07				

COMPONENTS		MOLE %	HHV btu/ft3	LLV btu/ft3	Exp Factor dscf/scf fuel
Oxygen		2.19			0.022
Nitrogen		32.46			0.325
Carbon Dioxide		30.15			0.302
Methane		35.20	355.52	320.11	3.017
Ethane	C2		0.00	0.00	0.000
Propane	C3		0.00	0.00	0.000
Iso-Butane	C4		0.00	0.00	0.000
N-Butane			0.00	0.00	0.000
Iso-Pentane	C5		0.00	0.00	0.000
N-Pentane			0.00	0.00	0.000
Hexane	C6		0.00	0.00	0.000
Heptane	C7		0.00	0.00	0.000
Octane	C8		0.00	0.00	0.000
Nonane	C9		0.00	0.00	
Total		**100.00**	**355.52**	**320.11**	**3.66**

CALCULATIONS

EXHAUST FLOW RATE, Q = (scfm*Exp Fac)*(20.92(20.92-%O2)

10846 DSCFM

EPA F-Factor = (scf exhaust/scf fuel)/(btu/scf fuel)*(1000000 btu/MMbtu)

10308 dscf/Mmbtu

SCAQMD Method 307.91

Facility: **Bradley Landfill**
Source: **Flare #2**
Job No.: **W07-042**
Date: **4/20/2005**

Sulfur Compounds

Speciated Compound		Concentration ppm, as H2S	No. of S molecules in Compound	Total S ppm, as H2S	SO2 Conc. mg/dscf	Avg. Inlet Flow Rate dscfm	SO2 Rate lb/hr
Hydrogen Sulfide		40.2	1	40.20	3.078	1628	0.663
Carbonyl Sulfide	<	0.080	1	0.08	0.006	1628	0.001
Methyl mercaptan		0.30	1	0.30	0.023	1628	0.005
Ethyl mercaptan		0.10	1	0.10	0.008	1628	0.002
Dimethyl sulfide		0.22	1	0.22	0.017	1628	0.004
Carbon disulfide	<	0.06	2	0.12	0.009	1628	0.002
Dimethyl disulfide	<	0.060	2	0.12	0.009	1628	0.002
iso-propyl mercaptan	<	0.06	1	0.06	0.005	1628	0.001
n-propyl mercaptan	<	0.06	1	0.06	0.005	1628	0.001
Total				41.26			0.680

SCAQMD Method 25.1 Analysis

Facility: **Bradley Landfill**
Source: **Flare #2**
Job No.: **W07-039**
Date: **4/20/2004**

TOTAL COMBUSTION ANALYSIS RESULTS

Sample ID	Inlet	Inlet	
Run Number	1A	1B	Average
Methane in Tank	352000	352000	352000
TNMHC,Tank (Noncond.)	517	563	
TNMHC - Condensables	1557.1	1710.0	
TNMHC - Total	2073.6	2272.8	
CO Concentration (ppm)	5.13	5.44	5.29
CO2 Concentration (ppm)	300000	303000	301500
O2 Concentration (%)	2.19	2.19	2.19
Sample Parameters			
Tank Number	U	T	
Trap Number	C	U	
Sample Tank Volume (l)	12.202	12.051	
Initial Pressure (Torr)	5.0	5.0	
Initial Temperature (deg. K)	292	292	
Final Pressure (mm Hg)	312	333	
Final Temperature (deg. K)	292	292	
Sample Volume (l)	4.95	5.22	
Analysis Pressure (mm Hg)	820	820	
Analysis Temperature (deg. K)	292	292	
ICV Volume (l)	2.266	2.266	
ICV Final Pressure (mm Hg)	800	800	
ICV Final Temperature (deg. K)	292	292	
CO2 in ICV (ppm)	3400	3940	
TNMHC,Trap (Condensables)	1557	1710	
Stack Total TNMHC	2074	2273	2173

NOTE: All hydrocarbon values are in terms of ppm, v/v, as methane.

SCAQMD Method 5.1 Particulate Emissions

Facility: **Bradley Landfill**
Source: **Flare #2**
Job No.: **W07-042**
Date: **4/20/2005**

STANDARD TEMPERATURE	Degrees F	60					
RUN NUMBER	******	1	2	1		2	
DATE OF RUN	******	04/20/05	04/23/05	04/20/05		04/23/05	
CLOCK TIME: INITIAL	******	928	1111	928		1111	
CLOCK TIME: FINAL	******	1058	1218	1058		1218	
AVG. STACK TEMPERATURE	Degrees F	1651	1643				
AVG. SQUARE DELTA P	Inches H20	0.1000	0.1000				
NOZZLE DIAMETER	Inches	1.020	1.020				
BAROMETRIC PRESSURE	Inches HG	29.07	29.07				
SAMPLING TIME	Minutes	60	60				
SAMPLE VOLUME	Cubic Feet	53.107	52.747				
AVG. METER TEMP.	Degrees F	78.2	83.8				
AVG. DELTA H	Inches H20	2.20	2.20				
DGM CALIB. FACTOR [Y]	******	1.0015	1.0015				
WATER COLLECTED	Milliliters	197	189				
CO 2	Percent	10.75	10.61				
O 2	Percent	9.35	9.34				
CO	Percent						
CH4	Percent						
N 2	Percent	79.90	80.05				
STACK AREA	Square Inches	7238.2	7238.2				
STATIC PRESSURE	Inches WG.	-0.010	-0.010				
PITOT COEFFICIENT	******	0.84	0.84				
SAMPLE VOLUME DRY	DSCF	50.21	49.35				
WATER AT STD.	SCF	9.3	8.9				
MOISTURE	Percent	15.6	15.3				
MOLE FRACTION DRY GAS	******	0.84	0.85				
MOLECULAR WT.DRY	lb/lb Mole	30.09	30.07				
EXCESS AIR	Percent	80	79				
MOLECULAR WT. WET	lb/lb Mole	28.21	28.22				
STACK GAS PRESSURE	Inches HG	29.07	29.07				
STACK VELOCITY	AFPM	691	690				
VOLUMETRIC FLOWRATE, DRY STD.	DSCFM	7019	7056	10716	*	10846	*
VOLUMETRIC FLOWRATE, ACTUAL	ACFM	34754	34681				
ISOKINETIC RATIO	Percent	104	102				

CALCULATIONS FOR GRAIN LOADING AND EMISSION RATES

TOTAL PARTICULATE	mg	9.9	7.4	9.9	7.4
PARTICULATE CONCENTRATION	gr/dscf	0.00304	0.00231	0.00304	0.00231
PARTICULATE EMISSION RATE	lb/hr	0.183	0.140	0.279	0.215

*Denotes the use of calculated flowrate based on expansion factor of LFG.

Facility:	**Bradley Landfill**	**Run No.:**	**1**
Source:	**Flare #2**	**Fuel:**	**LFG**
Job No.:	**W07-042**	**Std. O2:**	**15**
Date:	**04/20/05**		

	O2 %	CO2 %	NOx ppm	CO ppm
Range:	25	20	25	100
Span:	12.05	6.99	13.00	50.80
Low:				
High:	20.01	12.01	20.00	80.20

** POST-TEST DRIFT (DIRECT)**

Values				
Zero:	0.00	0.00	0.25	0.00
Span:	11.88	6.70	13.20	50.50

Percent Drift				
Zero:	0.00	0.00	1.00	0.00
Span:	-0.68	-1.45	0.80	-0.30

** PRE-TEST BIAS **

Values				
Zero:	0.00	0.20	0.00	0.00
Span:	11.88	6.70	12.75	49.50

** POST-TEST BIAS **

Values				
Zero:	0.00	0.00	0.25	0.00
Span:	11.88	6.70	13.20	50.50

** BIAS CORRECTION **

Zero Average	0.00	0.10	0.13	0.00
Span Average	11.88	6.70	12.98	50.00

** POST-TEST DRIFT (BIAS)**

Percent Drift				
Zero:	0.00	1.00	-1.00	0.00
Span:	0.00	0.00	-1.80	-1.00

Bias-Corrected Concentration	**9.35**	**10.75**	**20.19**	**1.70**
Bias-Corrected Conc.(O2 adjusted)			**10.31**	**0.87**

** RAW AVERAGE CONCENTRATION **

Average:		9.22	10.25	20.08	1.68	
O2 adjust:	15.0			10.14	0.85	
Date	Time	O2	CO2	NOx	CO	
20-Apr-05	928	9.16	10.45	18.32	2.48	Port A
20-Apr-05	929	9.08	10.44	18.00	2.54	
20-Apr-05	930	9.11	10.41	18.39	2.66	
20-Apr-05	931	9.21	10.14	17.82	2.58	
20-Apr-05	932	9.43	10.25	17.90	2.53	
20-Apr-05	933	9.07	10.47	18.68	2.27	
20-Apr-05	934	9.12	10.34	18.41	2.28	
20-Apr-05	935	9.34	10.13	17.80	2.14	
20-Apr-05	936	9.31	10.24	17.80	2.36	
20-Apr-05	937	9.18	10.37	18.15	2.37	
20-Apr-05	938	9.16	10.32	18.15	2.17	
20-Apr-05	939	9.23	10.24	17.76	1.88	
20-Apr-05	940	9.34	10.07	17.64	2.02	
20-Apr-05	941	9.33	10.24	19.98	2.46	
20-Apr-05	942	9.20	10.38	20.64	1.86	
20-Apr-05	943	8.93	10.55	21.06	1.75	
20-Apr-05	944	9.00	10.43	20.74	1.62	
20-Apr-05	945	8.92	10.49	20.61	1.61	
20-Apr-05	946	9.17	10.36	20.35	1.80	
20-Apr-05	947	9.00	10.54	20.13	1.53	
20-Apr-05	948	8.96	10.50	20.27	1.39	
20-Apr-05	949	8.83	10.57	20.48	1.29	
20-Apr-05	950	8.95	10.51	20.44	1.37	
20-Apr-05	951	8.87	10.50	20.44	1.32	
20-Apr-05	952	8.90	10.49	20.98	1.29	
20-Apr-05	953	9.27	10.27	20.17	1.28	
20-Apr-05	954	9.06	10.44	20.57	1.33	
20-Apr-05	955	9.09	10.36	20.14	1.51	
20-Apr-05	956	8.95	10.54	20.56	1.03	
20-Apr-05	957	8.94	10.46	20.23	0.71	
20-Apr-05	958	8.98	10.45	20.61	0.86	
20-Apr-05	1008	9.00	10.45	22.20	-0.02	Port B
20-Apr-05	1009	9.24	10.12	21.18	-0.02	
20-Apr-05	1010	9.32	10.24	21.64	0.08	
20-Apr-05	1011	9.13	10.30	21.66	0.69	
20-Apr-05	1012	9.32	10.10	20.87	1.29	
20-Apr-05	1013	9.42	10.07	20.74	1.44	
20-Apr-05	1014	9.51	9.87	20.29	2.00	
20-Apr-05	1015	9.59	10.03	20.30	1.71	
20-Apr-05	1016	9.19	10.33	20.84	1.68	

20-Apr-05	1017	9.11	10.34	20.48	2.16
20-Apr-05	1018	9.11	10.32	20.53	2.16
20-Apr-05	1019	9.01	10.42	20.39	2.68
20-Apr-05	1020	9.37	10.01	19.61	2.87
20-Apr-05	1021	9.22	10.19	19.99	2.54
20-Apr-05	1022	9.24	10.25	20.09	2.22
20-Apr-05	1023	9.05	10.39	20.61	2.03
20-Apr-05	1024	9.24	10.18	20.67	2.13
20-Apr-05	1025	9.26	10.17	20.66	2.28
20-Apr-05	1026	9.25	10.07	20.48	2.30
20-Apr-05	1027	9.51	10.00	20.19	2.17
20-Apr-05	1028	9.34	10.11	20.28	2.04
20-Apr-05	1029	9.24	10.10	20.43	1.77
20-Apr-05	1030	9.48	9.89	20.22	1.88
20-Apr-05	1031	9.68	9.76	20.75	2.16
20-Apr-05	1032	9.69	9.83	20.67	1.24
20-Apr-05	1033	9.40	10.09	21.41	0.81
20-Apr-05	1034	9.41	10.02	21.68	0.66
20-Apr-05	1035	9.70	9.72	20.66	0.73
20-Apr-05	1036	9.67	9.86	20.57	0.63
20-Apr-05	1037	9.34	10.15	20.78	0.69
20-Apr-05	1038	9.45	10.01	20.95	0.66

Facility:	**Bradley Landfill**	**Run No.:**	**2**
Source:	**Flare #2**	**Fuel:**	**LFG**
Job No.:	**W07-042**	**Std. O2:**	**15**
Date:	**04/20/05**		

	O2 %	CO2 %	NOx ppm	CO ppm
Range:	25	20	25	100
Span:	12.05	6.99	13.00	50.80
Low:				
High:	20.01	12.01	20.00	80.20

** POST-TEST DRIFT (DIRECT)**

Values				
Zero:	0.00	0.00	0.00	0.00
Span:	11.80	6.70	13.13	50.50

Percent Drift				
Zero:	0.00	0.00	0.00	0.00
Span:	-1.00	-1.45	0.50	-0.30

** PRE-TEST BIAS **

Values				
Zero:	0.00	0.00	0.25	0.00
Span:	11.88	6.70	13.20	50.50

** POST-TEST BIAS **

Values				
Zero:	0.00	0.00	0.00	0.00
Span:	11.80	6.70	13.13	50.50

** BIAS CORRECTION **

Zero Average	0.00	0.00	0.13	0.00
Span Average	11.84	6.70	13.16	50.50

** POST-TEST DRIFT (BIAS)**

Percent Drift				
Zero:	0.00	0.00	1.00	0.00
Span:	0.32	0.00	0.30	0.00

Bias-Corrected Concentration	**9.34**	**10.61**	**19.53**	**0.93**
Bias-Corrected Conc.(O2 adjusted)			**9.97**	**0.48**

** RAW AVERAGE CONCENTRATION **

Average:		9.18	10.17	19.71	0.93
O2 adjust:	15.0			9.92	0.47

Date	Time	O2	CO2	NOx	CO	
20-Apr-05	1111	8.89	10.48	21.56	-0.11	Port A
20-Apr-05	1112	8.98	10.34	20.80	0.23	
20-Apr-05	1113	9.40	9.98	19.88	1.19	
20-Apr-05	1114	9.41	10.06	20.10	1.26	
20-Apr-05	1115	9.35	10.06	19.79	1.08	
20-Apr-05	1116	9.21	10.25	20.14	1.13	
20-Apr-05	1117	9.07	10.41	20.39	1.53	
20-Apr-05	1118	8.87	10.49	20.84	1.98	
20-Apr-05	1119	8.83	10.60	21.36	2.17	
20-Apr-05	1120	8.98	10.32	20.35	2.11	
20-Apr-05	1121	9.19	10.18	20.04	2.20	
20-Apr-05	1122	9.32	10.07	20.04	2.13	
20-Apr-05	1123	9.35	10.08	19.91	1.79	
20-Apr-05	1124	9.19	10.27	20.81	1.17	
20-Apr-05	1125	9.00	10.36	20.97	1.33	
20-Apr-05	1126	9.93	9.15	9.41	1.50	
20-Apr-05	1127	10.52	8.84	8.56	1.70	
20-Apr-05	1128	10.80	8.66	8.14	1.62	
20-Apr-05	1129	10.80	8.60	8.03	1.99	
20-Apr-05	1130	10.75	8.73	8.12	1.98	
20-Apr-05	1131	10.72	8.67	8.13	2.13	
20-Apr-05	1132	10.76	8.70	13.75	2.15	
20-Apr-05	1133	10.04	9.69	19.28	3.06	
20-Apr-05	1134	8.92	10.54	21.67	2.26	
20-Apr-05	1135	8.86	10.49	21.60	1.21	
20-Apr-05	1136	8.73	10.51	21.83	0.76	
20-Apr-05	1137	9.07	10.10	20.81	1.60	
20-Apr-05	1138	9.53	9.97	20.21	2.11	
20-Apr-05	1139	9.19	10.20	20.45	1.73	
20-Apr-05	1140	9.49	9.48	9.81	1.56	
20-Apr-05	1141	10.77	8.57	8.46	1.91	
20-Apr-05	1148	8.50	10.76	23.38	-0.15	Port B
20-Apr-05	1149	8.63	10.64	22.54	0.08	
20-Apr-05	1150	8.38	10.93	23.06	0.58	
20-Apr-05	1151	8.47	10.85	22.84	0.70	
20-Apr-05	1152	8.83	10.44	21.62	0.84	
20-Apr-05	1153	8.88	10.43	21.46	0.72	
20-Apr-05	1154	8.95	10.45	21.59	0.26	
20-Apr-05	1155	8.89	10.56	21.79	0.36	
20-Apr-05	1156	8.63	10.68	22.37	0.35	

20-Apr-05	1157	8.79	10.46	21.85	0.48
20-Apr-05	1158	8.77	10.64	22.15	0.00
20-Apr-05	1159	8.57	10.80	22.72	0.18
20-Apr-05	1200	8.69	10.64	22.53	0.18
20-Apr-05	1201	8.75	10.52	22.27	0.27
20-Apr-05	1202	8.70	10.67	22.47	0.49
20-Apr-05	1203	8.86	10.45	22.00	0.34
20-Apr-05	1204	8.86	10.45	21.84	0.20
20-Apr-05	1205	8.86	10.48	21.91	0.18
20-Apr-05	1206	8.92	10.45	22.02	-0.05
20-Apr-05	1207	8.80	10.63	22.35	0.10
20-Apr-05	1208	8.76	10.44	21.90	0.32
20-Apr-05	1209	8.90	10.48	22.01	0.27
20-Apr-05	1210	8.84	10.41	21.90	0.12
20-Apr-05	1211	8.63	10.65	22.50	0.05
20-Apr-05	1212	8.76	10.52	22.44	0.29
20-Apr-05	1213	9.07	10.20	21.41	0.18
20-Apr-05	1214	8.87	10.58	22.40	0.03
20-Apr-05	1215	9.07	10.18	21.94	-0.07
20-Apr-05	1216	9.22	10.21	21.78	-0.09
20-Apr-05	1217	8.99	10.32	22.28	-0.10
20-Apr-05	1218	9.24	10.05	21.44	-0.09

Facility: Waste Management
Source: Flare #2
Job No.: W07-042
Test Date: 4/20/05

Method 100.1 Performance Data

PRETEST CALIBRATION ERROR				
LEAK CHECK				
RANGE :	25 O2	20 CO2	100 CO	25 NOx
ZERO				
Instrument	0.00	0.00	0.00	0.00
Cylinder	0.00	0.00	0.00	0.00
Difference (%)	0.00	0.00	0.00	0.00
LOW LEVEL				
Instrument				
Cylinder				
Difference (%)	0.00	0.00	0.00	0.00
MID LEVEL				
Instrument	12.10	7.00	51.00	13.00
Cylinder	12.05	6.99	50.80	13.00
Difference (%)	0.20	0.05	0.20	0.00
HIGH LEVEL				
Instrument	20.25	11.70	80.00	20.13
Cylinder	20.01	12.01	80.20	20.00
Difference (%)	0.98	-1.55	-0.20	0.50

PRETEST LINEARITY	Cylinder	Instrument
	O2	
Zero	0.00	0.00
High Level	20.01	20.25
Slope	0.99	
Intercept	0.00	Status
Predicted Value	12.19	<1
Linearity (%)	0.38	PASS
	CO2	
Zero	0.00	0.00
High Level	12.01	11.70
Slope	1.03	
Intercept	0.00	Status
Predicted Value	6.81	<1
Linearity (%)	0.95	PASS
	CO2	
Zero	0.00	0.00
High Level	80.20	80.00
Slope	1.00	
Intercept	0.00	Status
Predicted Value	50.67	<1
Linearity (%)	0.33	PASS
	NOX	
Zero	0.00	0.00
High Level	20.00	20.13
Slope	0.99	
Intercept	0.00	Status
Predicted Value	13.08	<1
Linearity (%)	0.33	PASS

SYSTEM RESPONSE TIME	#1	#2	#3
Upscale			
NOx	31		
CO	78		
O2	32		
CO2	25		
Downscale			
NOx	27		
CO	70		
O2	30		
CO2	20		

NO2 CONVERTER EFFICIENCY	ppm	%	status
Cylinder(Co)	18.50		
NO Mode(C1)	0.80		
NOx Mode(C2)	17.75		
D1	17.70		
D2	16.95		
D3	0.75		
CE		95.76	
CE > 90 %			PASS

POST TEST CALIBRATION ERROR				
LEAK CHECK				
	O2	CO2	CO	NOx
ZERO				
Instrument	-0.25	0.00	0.00	0.00
Cylinder	0.00	0.00	0.00	0.00
Difference (%)	-1.00	0.00	0.00	0.00
LOW LEVEL				
Instrument				
Cylinder				
Difference (%)	0.00	0.00	0.00	0.00
MID LEVEL				
Instrument	12.00	7.00	50.50	13.00
Cylinder	12.05	6.99	50.80	13.00
Difference (%)	-0.20	0.05	-0.30	0.00
HIGH LEVEL				
Instrument	20.00	12.30	80.50	20.13
Cylinder	20.01	12.01	80.20	20.00
Difference (%)	-0.04	1.45	0.30	0.52

POST TEST LINEARITY	Cylinder	Instrument
	O2	
Zero	0.00	-0.25
High Level	20.01	20.00
Slope	0.99	
Intercept	0.25	Status
Predicted Value	11.94	<1
Linearity (%)	0.22	PASS
	CO2	
Zero	0.00	0.00
High Level	12.01	12.30
Slope	0.98	
Intercept	0.00	Status
Predicted Value	7.16	<1
Linearity (%)	0.78	PASS
	CO	
Zero	0.00	0.00
High Level	80.20	80.50
Slope	1.00	
Intercept	0.00	Status
Predicted Value	50.99	<1
Linearity (%)	0.49	PASS
	NOX	
Zero	0.00	0.00
High Level	20.00	20.13
Slope	0.99	
Intercept	0.00	Status
Predicted Value	13.08	<1
Linearity (%)	0.34	PASS

Table 5-2
Trace Organic Species
Destruction Efficiency Results
Waste Management - Bradley Landfill
Flare #2
April 20, 2005

		INLET Flow rate	1628	dscfm		OUTLET Flow rate	10781.06	dscfm
Species	Conc. (ppb)	Conc. (mg/dscf)	Em. Rate (lb/hr)		Conc. (ppb)	Conc. (mg/dscf)	Em. Rate (lb/hr)	Dest. Eff. (%)
Hydrogen Sulfide	40200	1.64E+00	3.53E-01		< 500	< 2.04E-02	< 2.91E-02	> 91.76
Benzene	258	2.41E-02	5.18E-03		1.5	1.40E-04	1.99E-04	96.15
Benzychloride	< 40	< 6.07E-03	< 1.31E-03		< 0.8	< 1.21E-04	< 1.73E-04	NA
Chlorobenzene	65	8.81E-03	1.90E-03		< 0.2	< 2.70E-05	< 3.85E-05	> 97.97
Dichlorobenzenes	176	3.09E-02	6.66E-03		< 1.1	< 1.93E-04	< 2.76E-04	> 95.86
1,1-dichloroethane	< 30	< 3.55E-03	< 7.64E-04		< 0.3	< 3.55E-05	< 5.06E-05	NA
1,2-dichloroethane	< 20	< 2.37E-03	< 5.10E-04		< 0.3	< 3.55E-05	< 5.06E-05	NA
1,1-dichloroethylene	< 30	< 3.48E-03	< 7.49E-04		< 0.3	< 3.48E-05	< 4.96E-05	NA
Dichloromethane	< 30	< 3.05E-03	< 6.56E-04		0.35	3.56E-05	< 5.07E-05	NA
1,2-Dibromoethane	< 30	< 6.74E-03	< 1.45E-03		< 0.3	< 6.74E-05	< 9.61E-05	NA
Perchloroethene	83	2.36E-02	5.07E-03		< 0.2	< 5.66E-05	< 8.08E-05	> 98.41
Carbon tetrachloride	< 30	< 5.52E-03	< 1.19E-03		< 0.2	< 3.68E-05	< 5.25E-05	NA
Toluene	690	7.59E-02	1.63E-02		0.90	< 9.90E-05	< 1.41E-04	99.14
1,1,1-trichloroethane	< 20	< 3.18E-03	< 6.85E-04		< 0.2	< 3.18E-05	< 4.53E-05	NA
Trichloroethene	38	6.00E-03	1.29E-03		< 0.2	< 3.13E-05	< 4.47E-05	> 96.54
Chloroform	< 20	< 2.84E-03	< 6.12E-04		< 0.2	< 2.84E-05	< 4.06E-05	NA
Vinyl Chloride	191	1.43E-02	3.07E-03		< 0.3	< 2.24E-05	< 3.20E-05	> 98.96
m+p-xylenes	1220	1.55E-01	3.33E-02		0.67	< 8.49E-05	< 1.21E-04	99.64
o-xylene	602	7.63E-02	1.64E-02		< 0.3	< 3.80E-05	< 5.42E-05	> 99.67
TNMHC	2173168	4.16E+01	8.95E+00		2972	5.68E-02	8.10E-02	99.09

Note: All values preceded by "<" are below the detection limit. The reported values are the detection limit.
NA--Not Applicale: Destruction efficiency can not be calculated since both inlet and outlet values are below the detection limit.

APPENDIX C - Laboratory Results

Facility: BRADLEY
Source: FLARE 2
Job No.: W07-042
Test Date: 04/20-21/05

SCAQMD Method 5.1

DATA SHEET FOR PARTICULATE MATTER SCAQMD METHOD 5.1

DATE SAMPLED: 04/20-21/05
DATE EXTRACTED: 04/21/05

RUN #1

	SAMPLE ID	BEAKER/ FILTER ID	VOLUME	INITIAL	FINAL	NET WEIGHT(g)
A - FILTER CATCH	W07042-M5-F2-1-PF	G5002	NA	0.0849	0.0860	0.0011
FILTER ACID						0.0000
FILTER SULFATE						
						0.0000
B - PROBE CATCH						0.0000
PROBE ACID						
PROBE SULFATE						0.0000
C - IMP.CATCH(INSOL)	W07042-M5-F2-1-EF	G5042	923	0.0827	0.0862	0.0035
INSOLUBLE ACID						0.0000
INSOLUBLE SULFATE						0.0000
D - IMP. CATCH (SOL)	W07042-M5-F2-1-R	B5051	923	30.7913	30.7944	0.0031
SOLUBLE ACID						0.0000
SOLUBLE SULFATE						0.0000
E - ORGANIC EXTRACT	W07042-M5-F2-1-MC	B5053	125	29.1891	29.1913	0.0022

TOTAL PARTICULATE	(A+B+C+D+E)	0.0099
SOLID PARTICULATE	(A+B+C+D)	0.0077

Facility: BRADLEY
Source: FLARE 2
Job No.: W07-042
Test Date: 04/20-21/05

SCAQMD Method 5.1

DATA SHEET FOR PARTICULATE MATTER SCAQMD METHOD 5.1

DATE SAMPLED: 04/20-21/05
DATE EXTRACTED: 04/21/05

RUN #2

	SAMPLE ID	BEAKER/ FILTER ID	VOLUME	INITIAL	FINAL	NET WEIGHT(g)
A - FILTER CATCH	W07042-M5-F2-2-PF	G5001	NA	0.0832	0.0840	0.0008
FILTER ACID						0.0000
FILTER SULFATE						
B - PROBE CATCH						0.0000
PROBE ACID						0.0000
PROBE SULFATE						
						0.0000
C - IMP.CATCH(INSOL)	W07042-M5-F2-2-EF	G5022	815	0.0832	0.0849	0.0017
INSOLUBLE ACID						0.0000
INSOLUBLE SULFATE						0.0000
D - IMP. CATCH (SOL)	W07042-M5-F2-2-R	B5066	815	28.3999	28.4036	0.0037
SOLUBLE ACID						0.0000
SOLUBLE SULFATE						0.0000
E - ORGANIC EXTRACT	W07042-M5-F2-2-MC	B5086	125	28.3627	28.3639	0.0012

TOTAL PARTICULATE	(A+B+C+D+E)	0.0074
SOLID PARTICULATE	(A+B+C+D)	0.0062

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location
Waste Management - Bradley Landfill	Plant #2 - Sun Valley, CA
Project No.	**Field Logbook No.**
W07-042	
Sampler: (Signature)	**Chain of Custody Tape No.**

Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample	Stainless steel 5.1	ANALYSES	REMARKS
W07042-MS.1-P2-1-R	4/21/05			Nutfeel 5.1	✓		Impingement & clearly visible flecks in inner line - Plant 2, Run 1 filter
W07042-MS.1-P2-1-PF					✓		
W07042-MS.1-P2-2-R					✓		Rinse - Plant 2, Run 2 filter
W07042-MS.1-P2-2-PF					✓		
W07042-MS.1-FB-R					✓		rinse filter
W07042-MS.1-FB-PF					✓		

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
	4/21/05	1530		04.21.05	1530
Relinquished by: (Signature)	**Date**	**Time**	**Received by: (Signature)**	**Date**	**Time**
Relinquished by: (Signature)	**Date**	**Time**	**Received for Laboratory: (Signature)**	**Date**	**Time**
Sample Disposal Method:			**Disposed of by: (Signature)**	**Date**	**Time**

SAMPLE COLLECTOR

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ANALYTICAL LABORATORY

Horizon

№ 8612

039

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location
Waste Management - Bradley Landfill	Plant #3 Sun Valley, CA
Project No.	**Field Logbook No.**
W07-042	
Sampler: (Signature)	**Chain of Custody Tape No.**

ANALYSES: Standard Method 51

Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample							REMARKS
W07042-MS1-F3-1-R	4/21/05			Method 51	✓						Rinse - Run 1
W07042-MS1-F3-1-PF	↓				✓						Filter - Run 1
W07042-MS1-F3-2-R					✓						Rinse - Run 2
W07042-MS1-F3-2-PF					✓						Filter - Run 2

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
	4/21/05	1530		04 21 05	1530
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received for Laboratory: (Signature)	Date	Time
Sample Disposal Method:	Disposed of by: (Signature)			Date	Time

SAMPLE COLLECTOR

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ANALYTICAL LABORATORY

HORIZON

Nº 8603

040

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LABORATORY ANALYSIS REPORT

Organic Carbon Analysis in Water Impinger and Methane & TGNMO Analysis in SUMMA Canister Samples from Impinger/Canister Train Sample Collection

Report Date: May 3, 2005
Client: Horizon Air Measurement Services, Inc.
Client Project No.: W07-042
Source Location : Waste Management / Bradley Landfill / Sun Valley CA.
Source ID: Flare No. 2 outlet

Date Received: April 21, 2005
Date Analyzed: April 21, & 25, 2005

Methane and total gaseous non-methane organics were measured by flame ionization detection/total combustion analysis (FID/TCA). Organic carbon in water vial samples were measured by Dohrman total organic carbon analyzer, water FID/TCA.

AtmAA Lab No.	Sample ID	Canister Methane	Canister Ethane	Canister TGNMO	Impinger Organic Carbon as Methane	Impinger Volume	P_1	P2
			(concentration, ppmv)			(ml)		
01115-6	S8 Outlet	<1	<1	2.21	---	---	502	820
	Impinger H39	---	---	---	0.38	2.26	--	--
01115-7	S19 Outlet	<1	<1	2.56	---	---	558	820
	Impinger H40	---	---	---	0.35	2.45	--	--

TGNMO is total gaseous non-methane organics (excluding ethane), reported as ppm methane. Ethane is reported as ppmv methane.
** Note - Impinger sample results are not field blank corrected. The field blank (impinger H88) contained 0.29ug carbon as methane, corresponding to 0.10 ppm methane for a 4.40 liter sample.*
P_1 and P_2 are initial and final pressures measured in mm Hg.

Michael L. Porter
Laboratory Director

041

QUALITY ASSURANCE SUMMARY
(Repeat Analysis)

Source Location : Waste Management / Bradley Landfill / Sun Valley CA.
Date Received: April 21, 2005
Date Analyzed: April 21, & 25, 2005

Components	Sample ID	Repeat Analysis Run #1 (Concentration in ppmv)	Repeat Analysis Run #2 (Concentration in ppmv)	Mean Conc. (Concentration in ppmv)	% Diff. From Mean (Concentration in ppmv)
Methane	S8 Outlet	<1	<1	---	---
	S19 Outlet	<1	<1	---	---
Ethane	S8 Outlet	<1	<1	---	---
	S19 Outlet	<1	<1	---	---
TGNMO	S8 Outlet	2.14	2.28	2.21	3.2
	S19 Outlet	2.54	2.58	2.56	0.78
Impinger TOC	Impinger H39	0.38	0.37	0.38	1.3
	Impinger H40	0.35	0.34	0.35	1.4

A set of 2 SUMMA canister/impinger samples, laboratory number 01115-(6 & 7), was analyzed for methane and total gaseous non-methane organics (TGNMO) & TOC. Agreement between repeat analysis is a measure of precision and is shown in the column "% Difference from Mean". The average % Difference from Mean for 4 repeat measurements from the sample set of 2 SUMMA canister/impinger samples is 1.7%.

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LABORATORY ANALYSIS REPORT

CO, CH_4, CO_2, and TGNMO Analysis in Tanks
and Traps by SCAQMD Method 25 (FID/TCA)

Report Date: May 3, 2005
Client: Horizon Air Measurement Services, Inc.
Client Project No.: W07-042
Source Location : Waste Management / Bradley Landfill, Sun Valley CA.
Source ID: Flare inlet

Date Received: April 25, & 27, 2005
Date Analyzed: April 25, & 28, 2005

AtmAA Lab No.	Sample ID			tank CO	tank CH_4	tank CO_2	tank Ethane	tank TGNMO	trap CO_2 in ICV	tank Oxygen	P_1	P_2
	Tank	Trap	ICV	(Concentrations in ppmv)						(%v)		
01155-7	U	C	5	5.13	352000	300000	9.47	507	3400	2.19	312	820
01155-8	T	U	4	5.44	352000	303000	9.82	553	3940	2.19	333	820
trap burn system blank			17						18.0			

TGNMO is total gaseous non-methane (excluding ethane) organics reported as ppm methane.
Ethane is reported as ppmv methane.

P_1 - *Initial Pressure, mm Hg*
P_2 - *Final Pressure, mm Hg*

Michael L. Porter
Laboratory Director

043

QUALITY ASSURANCE SUMMARY
(Repeat Analyses)

Client Project No.: W07-042
Date Received: April 25, & 27, 2005
Date Analyzed: April 25, & 28, 2005

Components	Sample ID	Repeat Analysis Run #1	Repeat Analysis Run #2	Mean Conc.	% Diff. From Mean
		(Concentration in ppmv)			
CO	TK U	5.42	4.85	5.13	5.5
CH_4	TK U	352000	353000	352000	0.14
CO_2	TK U	303000	297000	300000	1.0
Ethane	TK U	9.57	9.38	9.47	0.99
TGNMO	TK U	509	504	507	0.43
CO_2 in ICV (in trap, transfer tanks)	ICV 5	3410	3380	3400	0.44
		(Concentration in %v)			
Oxygen	TK U	2.22	2.17	2.19	1.2

A set of 2 TCA samples, laboratory numbers 01155-(7-8), was analyzed for CO, CH_4, CO_2, and total gaseous non-methane organics (TGNMO). Agreement between repeat analyses is a measure of precision and is shown above in the column "% Difference from Mean". The average % Difference from Mean for 7 repeat measurements from the sample set of 2 TCA samples is 1.4%.

Gas standards (containing CO, CH_4, CO_2 and isobutane) used for TCA analyses, were prepared and certified by Praxair.

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LABORATORY ANALYSIS REPORT

SCAQMD Rule 1150.1 Components Analysis in Inlet Gas Tedlar Bag Sample

Report Date: May 2, 2005
Client: Horizon / WMNA
Project Location: Bradley LF #2 Flare
Client Project No.: W07-042
Date Received: April 21, 2005
Date Analyzed: April 21 & 22, 2005

AtmAA Lab No.:	01115-4
Sample I.D.:	W07042
	F2-M309.91-I
Components	*(Concentration in ppmv)*
Hydrogen sulfide	40.2
	(Concentration in ppbv)
Benzene	258
Benzylchloride	<40
Chlorobenzene	65.2
Dichlorobenzenes*	176
1,1-dichloroethane	<30
1,2-dichloroethane	<20
1,1-dichloroethylene	<30
Dichloromethane	<30
1,2-dibromoethane	<30
Perchloroethylene	83.2
Carbon tetrachloride	<30
Toluene	690
1,1,1-trichloroethane	<20
Trichloroethene	38.3
Chloroform	<20
Vinyl chloride	191
m+p-xylenes	1220
o-xylene	602

** total amount containing meta, para, and ortho isomers*

Michael L. Porter
Laboratory Director

045

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LABORATORY ANALYSIS REPORT

Hydrogen Sulfide and Reduced Sulfur Compounds
Analysis in Inlet Tedlar Bag Sample

Report Date: May 2, 2005
Client: Horizon / WMNA
Project Location: Bradley LF #2 Flare
Client Project No.: W07-042
Date Received: April 21, 2005
Date Analyzed: April 21, 2005

ANALYSIS DESCRIPTION

Hydrogen sulfide was analyzed by gas chromatography with a Hall electrolytic conductivity detector operated in the oxidative sulfur mode. All other components were measured by GC/ Mass Spec.

	AtmAA Lab No.:	01115-4
	Sample I.D.:	W07042
		F2-M309.91-I
Components		*(Concentration in ppmv)*
Hydrogen sulfide		40.2
Carbonyl sulfide		<0.08
Methyl mercaptan		0.30
Ethyl mercaptan		0.10
Dimethyl sulfide		0.22
Carbon disulfide		<0.06
isopropyl mercaptan		<0.06
n-propyl mercaptan		<0.06
Dimethyl disulfide		<0.06
TRS		40.8

TRS - total reduced sulfur

Michael L. Porter
Laboratory Director

QUALITY ASSURANCE SUMMARY
(Repeat Analyses)

Client Project No.: W07-042
Date Received: April 21, 2005
Date Analyzed: April 21 & 22, 2005

Components	Sample ID	Repeat Analysis Run #1	Repeat Analysis Run #2	Mean Conc.	% Diff. From Mean
		(Concentration in ppbv)			
Benzene	F2-M309.91-I	248	268	258	3.9
Benzylchloride	F2-M309.91-I	<40	<40	---	---
Chlorobenzene	F2-M309.91-I	65.5	64.9	65.2	0.46
Dichlorobenzenes	F2-M309.91-I	188	163	176	7.1
1,1-dichloroethane	F2-M309.91-I	<30	<30	---	---
1,2-dichloroethane	F2-M309.91-I	<20	<20	---	---
1,1-dichloroethylene	F2-M309.91-I	<30	<30	---	---
Dichloromethane	F2-M309.91-I	<30	<30	---	---
1,2-dibromoethane	F2-M309.91-I	<30	<30	---	---
Perchloroethylene	F2-M309.91-I	83.2	83.2	83.2	0.0
Carbon tetrachloride	F2-M309.91-I	<30	<30	---	---
Toluene	F2-M309.91-I	689	690	690	0.072
1,1,1-trichloroethane	F2-M309.91-I	<20	<20	---	---
Trichloroethene	F2-M309.91-I	37.2	39.4	38.3	2.9
Chloroform	F2-M309.91-I	<20	<20	---	---
Vinyl chloride	F2-M309.91-I	192	190	191	0.52
m+p-xylenes	F2-M309.91-I	1240	1210	1220	1.2
o-xylene	F2-M309.91-I	609	595	602	1.2

QUALITY ASSURANCE SUMMARY
(Repeat Analyses)
(continued)

Sulfur Components	Sample ID	Repeat Analysis Run #1	Repeat Analysis Run #2	Mean Conc.	% Diff. From Mean
		(Concentration in ppmv)			
Hydrogen sulfide	F2-M309.91-I	39.7	40.7	40.2	1.2
Carbonyl sulfide	F2-M309.91-I	<0.08	<0.08	---	---
Methyl mercaptan	F2-M309.91-I	0.28	0.33	0.30	8.2
Ethyl mercaptan	F2-M309.91-I	0.10	0.10	0.10	0.0
Dimethyl sulfide	F2-M309.91-I	0.22	0.23	0.22	2.2
Carbon disulfide	F2-M309.91-I	<0.06	<0.06	---	---
iso-propyl mercaptan	F2-M309.91-I	<0.06	<0.06	---	---
n-propyl mercaptan	F2-M309.91-I	<0.06	<0.06	---	---
Dimethyl disulfide	F2-M309.91-I	<0.06	<0.06	---	---

One Tedlar bag sample, laboratory number 01115-4, was analyzed for SCAQMD Rule 1150.1 components, hydrogen sulfide, and total reduced sulfur compounds. Agreement between repeat analyses is a measure of precision and is shown above in the column "% Difference from Mean". Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 13 repeat measurements from the one Tedlar bag sample is 2.2%.

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LABORATORY ANALYSIS REPORT

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SCAQMD Rule 1150.1 Components Analysis in Outlet Tedlar Bag Sample

Report Date: May 2, 2005
Client: Horizon / WMNA
Project Location: Bradley LF #2 Flare
Client Project No.: W07-042
Date Received: April 21, 2005
Date Analyzed: April 21, 2005

AtmAA Lab No.:	01115-5
Sample I.D.:	W07042 F2-VOCS-O
Components	*(Concentration in ppbv)*
Hydrogen sulfide	<500
Benzene	1.50
Benzylchloride	<0.8
Chlorobenzene	<0.3
Dichlorobenzenes*	<1.1
1,1-dichloroethane	<0.3
1,2-dichloroethane	<0.3
1,1-dichloroethylene	<0.3
Dichloromethane	0.35
1,2-dibromoethane	<0.3
Perchloroethylene	<0.2
Carbon tetrachloride	<0.2
Toluene	0.90
1,1,1-trichloroethane	<0.2
Trichloroethene	<0.2
Chloroform	<0.2
Vinyl chloride	<0.3
m+p-xylenes	0.67
o-xylene	<0.3

** total amount containing meta, para, and ortho isomers*

Michael L. Porter
Laboratory Director

QUALITY ASSURANCE SUMMARY
(Repeat Analyses)

Client Project No.: W07-042
Date Received: April 21, 2005
Date Analyzed: April 21, 2005

Components	Sample ID	Repeat Analysis Run #1	Repeat Analysis Run #2	Mean Conc.	% Diff. From Mean
		(Concentration in ppbv)			
Hydrogen sulfide	F2-VOCS-O	<500	<500	---	---
Benzene	F2-VOCS-O	1.52	1.49	1.50	1.0
Benzylchloride	F2-VOCS-O	<0.8	<0.8	---	---
Chlorobenzene	F2-VOCS-O	<0.3	<0.3	---	---
Dichlorobenzenes	F2-VOCS-O	<1.1	<1.1	---	---
1,1-dichloroethane	F2-VOCS-O	<0.3	<0.3	---	---
1,2-dichloroethane	F2-VOCS-O	<0.3	<0.3	---	---
1,1-dichloroethylene	F2-VOCS-O	<0.3	<0.3	---	---
Dichloromethane	F2-VOCS-O	0.35	0.35	0.35	0.0
1,2-dibromoethane	F2-VOCS-O	<0.3	<0.3	---	---
Perchloroethylene	F2-VOCS-O	<0.2	<0.2	---	---
Carbon tetrachloride	F2-VOCS-O	<0.2	<0.2	---	---
Toluene	F2-VOCS-O	0.95	0.84	0.90	6.1
1,1,1-trichloroethane	F2-VOCS-O	<0.2	<0.2	---	---
Trichloroethene	F2-VOCS-O	<0.2	<0.2	---	---
Chloroform	F2-VOCS-O	<0.2	<0.2	---	---
Vinyl chloride	F2-VOCS-O	<0.3	<0.3	---	---
m+p-xylenes	F2-VOCS-O	0.69	0.65	0.67	3.0
o-xylene	F2-VOCS-O	<0.3	<0.3	---	---

One Tedlar bag sample, laboratory number 01115-5, was analyzed for SCAQMD Rule 1150.1 components. Agreement between repeat analyses is a measure of precision and is shown above in the column "% Difference from Mean". Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 4 repeat measurements from one Tedlar bag sample is 2.5%.

CHAIN OF CUSTODY RECORD

Client/Project Name: Waste Management - Bradley Landfill

Project Location: Flare #2, Sun Valley, CA

Project No.: W07-042

Field Logbook No.:

Sampler: (Signature) [signature]

Chain of Custody Tape No.:

ANALYSES: Total Reduced Sulfurs (Sigmund 307.91 / Method 307.91); Speciated VOC's (Rule 1150.1 list); TRACT; O2; Total TCA (method 25.3); CH_4, Toluene (Method 25.3); PCI

Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample	Total Reduced Sulfurs	Speciated VOC's	TRACT	O2	Total TCA	CH4, Toluene	PCI	REMARKS
W07042-F2-1307.91-I	5/20/05		01115-4	Tedlar Bag	✓	✓						Inlet
W07-042-F2-VOC's-O			5	"		✓						Outlet
Summa 58			6	Method 25.3			1139			✓	.25	Outlet
59			7	"			1140			✓	.25	"
Tank A			8	Method 25.1			P	✓	✓		.25	Inlet
D			9				DF4	✓	✓		.25	"

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	4/20/05	14:45	[signature]	04.20.05	1845
[signature]	04.21.05	1005	Michael Porter	4/21/05	
			Received for Laboratory: (Signature)		

Sample Disposal Method:

Disposed of by: (Signature) | Date | Time

SAMPLE COLLECTOR

HORIZON AIR MEASUREMENT SERVICES, INC
996 Lawrence Drive, Suite 108
Newbury Park, CA 91320
(805) 498-8781 Fax (805) 498-3173

ANALYTICAL LABORATORY

AtmAA Inc.

№ 8613

651

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location
WASTE MNGMT / Bradley LF	Sun Valley, CA
Project No. W07-042	**Field Logbook No.**
Sampler: (Signature) [signature]	**Chain of Custody Tape No.**

ANALYSES: SCAQMD 25.1 (TGA) / O2 / Fixed / ...

Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample	SCAQMD 25.1 (TGA)	O2	Fixed				REMARKS
TANK U	4/23/05		011554-7		X	X	6	26			Flare #2 Inlet
T			-8		X	X	U	2.5			"

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	4/25/05	1010	[signature]	4/25/05	1010
Relinquished by: (Signature) [signature]	4/25/05	1100	**Received by: (Signature)** Michael Porter	4/25/05	1010
Relinquished by: (Signature)			**Received for Laboratory: (Signature)**		

Sample Disposal Method:	Disposed of by: (Signature)	Date	Time

SAMPLE COLLECTOR

HORIZON AIR MEASUREMENT SERVICES, INC
996 Lawrence Drive, Suite 108
Newbury Park, CA 91320
(805) 498-8781 Fax (805) 498-3173

ANALYTICAL LABORATORY

№ 8772

052

APPENDIX D - Field Data Sheets

Facility: Bradley LF
Source: LFG Flare "2 In
Job #: W04-012
Date: 4/21/04
Operator: MC

Run #: 1

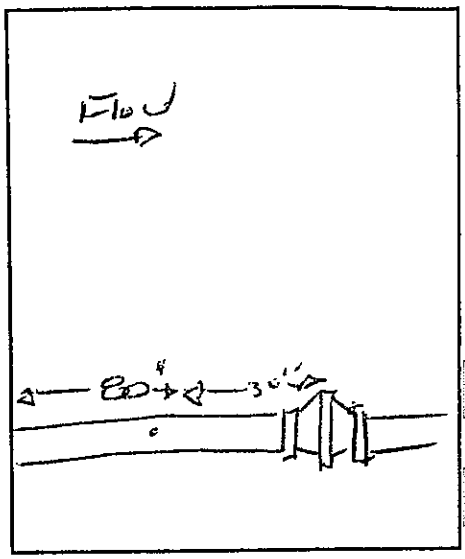
Baro. Press: 29.07
Static Press: 6.0 "WC
Pitot Tube #: STD 24"
Pitot Tube Type: STD
Magnahelic: #1 #3
MC

D_1 upstream: 3.0
D_1 downstream: 8.0
Stack Diameter: 10"

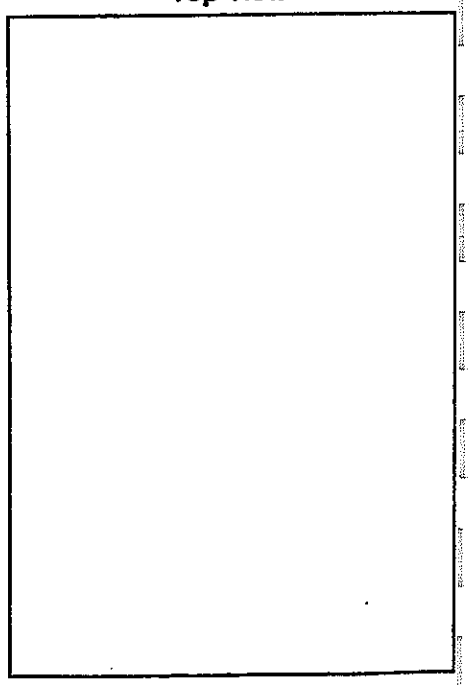
Leak Check
Initial: ✓
Final: ✓

Point #	Position in.	Velocity Head in. H_2O	Stack Temp °F	Cyclonic Flow Angle
A-8		0.60	120	
7		0.60	117	
6		0.60	117	
5		0.80	117	
4		0.80	117	
3		0.80	117	
2		0.80	117	
1		0.70	117	
Average		$\sqrt{\Delta P}$=0.833	T_s=117.1	∠=

Side View



Top View

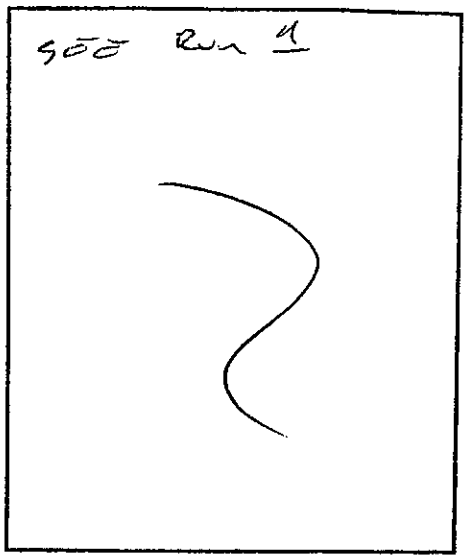


Facility: Bradley Li= | Baro. Press: 29.07 | D$_1$ upstream: 3.0
Source: LFG Flare #2 In | Static Press: 6.0 " | D$_1$ downstream: 8.0
Job #: W07-042 | Pitot Tube #: STD 24' | Stack Diameter: 10"
Date: 4/20/07 | Pitot Tube Type: STD | Leak Check
Operator: RE | Magnahelic: #3 | Initial: ✓ | Final: ✓

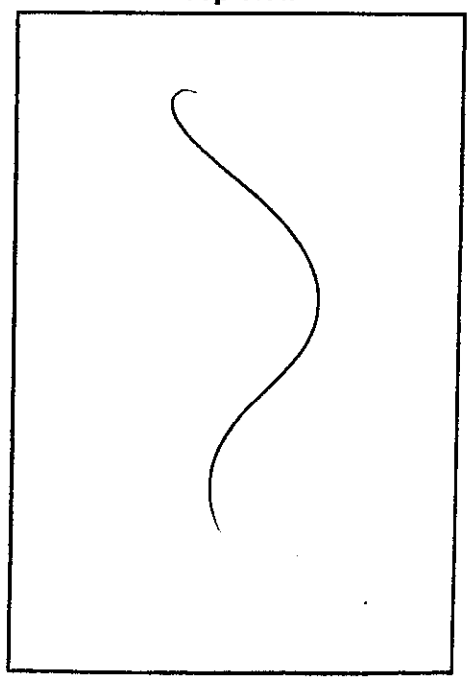
Run #: 2

Point #	Position in.	Velocity Head in. H_2O	Stack Temp °F	Cyclonic Flow Angle
A-B		0.60	125	
I		0.60	125	
6		0.70	126	
5		0.80	125	
4		0.80	125	
3		0.80	125	
2		0.80	125	
1		0.60	126	
Average		√ΔP= 0.883	T_s= 125	∠=

Side View



Top View



PARTICULATE FIELD DATA

PLANT Bradley LF
DATE 4/20/05
LOCATION Simi Valley, CA
OPERATOR MC
SOURCE LFG Flare #2 Inlet
RUN NO. 1-SCAQMD meth v.1
SAMPLE BOX NO. C10
TIME START 0928

METER BOX NO. 5
METER ΔH @ 1.6449
Y= 1.0110
PROBE I.D. NO. NA
NOZZLE DIAMETER, in. NA
STACK DIAMETER, in. 10"
PROBE HEATER SETTING NA
HEATER BOX SETTING NA
Δ Cp FACTOR NA
FILTER NO. NA

ASSUMED MOISTURE, % NA
AMBIENT TEMPERATURE 70 F
BARO. PRESS. 29.02
STATIC PRESS. NA
NOMAGRAPH INDEX NA

PRE TEST LEAK CHECKS
METER 0.001 @ 14 in. Hg
PITOTS ____ @ ____ in. Hg
ORSAT ____

P#	TIME	T_s °F	ΔP in H_2O	√ΔP	ΔH in H_2O	Vm ft^3	$T_{m\,IN}$ °F	T_m OUT °F	OVEN °F	IMP. OUT °F	VAC. (in Hg)
G	00	NA	NA	NA	1.6	615.698	71	72	NA	71	3
	10				1.6	623.8	78	72		58	3
	20				1.6	631.0	81	74		57	5
09	30				1.6	638.663	74	75		64	3
1000	40				1.6	646.3	83	75		59	3
	50				1.6	653.8	86	77		58	5
	60					661.313					
Avg.					1.6	45.615		76.5			

TIME END = 1028

Volume of Liquid Water Collected	Impinger Volume 1	2	3	4	Silica Gel Wght. 5
Final	132	110	6		275
Initial	100	100	0		263
Liquid Collected	32	10	0		12
Total Vol. Collected					54

POST TEST LEAK CHECKS
Meter 0.001 @ 6 in. Hg
Pitots ____ @ ____ in. Hg
Orsat ____

Orsat Meas.	Time	CO_2	O_2	CO	N_2
1					
2					
3					

Nozzle Cal	D_1	D_2	D_3	Average
				056

PARTICULATE FIELD DATA

PLANT Bradley LF
DATE 4/20/05
LOCATION Sun Valley, CA
OPERATOR RC
SOURCE LFG Flare #2
RUN NO. 2-Scrubber outlet
SAMPLE BOX NO. C-9
TIME START 1111

METER BOX NO. 5
METER ΔH @ 1.6449
Y= 1.0110
PROBE I.D. NO. NA
NOZZLE DIAMETER, in. NA
STACK DIAMETER, in. 10"
PROBE HEATER SETTING NA
HEATER BOX SETTING NA
Δ Cp FACTOR NA
FILTER NO. NA

ASSUMED MOISTURE, % NA
AMBIENT TEMPERATURE 75°F
BARO. PRESS. 29.07
STATIC PRESS. NA
NOMAGRAPH INDEX NA

PRE TEST LEAK CHECKS
METER <0.001 @ 5 in. Hg
PITOTS ____ @ ____ in. Hg
ORSAT ____

P#	TIME	T_s °F	ΔP in H_2O	√ΔP	ΔH in H_2O	Vm ft^3	$T_{m\,IN}$ °F	T_m OUT °F	OVEN °F	IMP. OUT °F	VAC. (in Hg)
5	00	NA	NA	NA	1.6	661.458	77	78	NA	71	<1
	10				1.6	668.2	86	78		60	<1
	20				1.6	676.3	88	80		57	<1
14	30				1.6	683.40	81	81		64	<1
120	40				1.6	691.4	90	81		58	<1
	50				1.6	699.0	91	82		56	<1
0	60					706.698					
Avg.					1.6	45.240	82.8				

TIME END = 1210

Volume of Liquid Water Collected	Impinger Volume 1	2	3	4	Silica Gel Wght. 5
Final	120	105	3		273
Initial	100	100	0		259
Liquid Collected	20	5	3		14
Total Vol. Collected					42

POST TEST LEAK CHECKS
Meter <0.001 @ 5 in. Hg
Pitots ____ @ ____ in. Hg
Orsat ____

Orsat Meas.	Time	CO_2	O_2	CO	N_2
1					
2					
3					

Nozzle Cal	D_1	D_2	D_3	Average
				057

Facility: Bradley LF
Source: Flare #2 Exh
Job #: W07-042
Date: 4/20/06
Operator: RC, TW

Run #: Preliminary

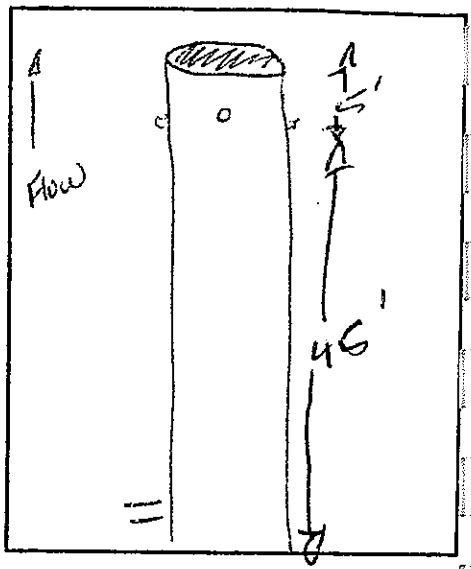
Baro. Press: 29.07
Static Press: 6.0" WC
Pitot Tube #: Inconel 10'
Pitot Tube Type: "S"
Magnahelic: Manometer

D_1 upstream:
D_1 downstream:
Stack Diameter: 96"

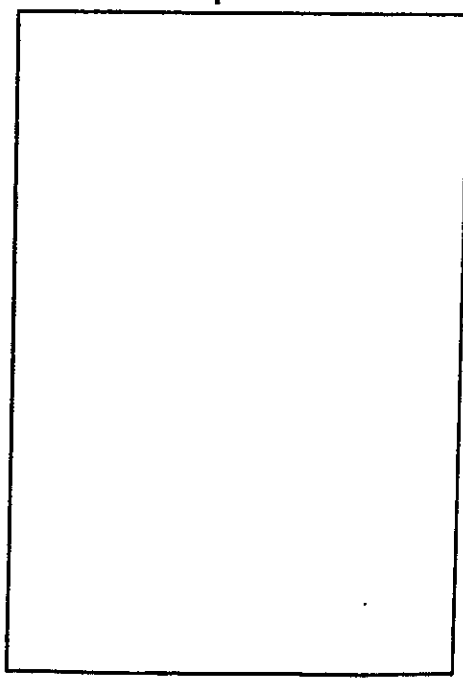
Leak Check
Initial: ✓ / ✓
Final: ✓ / ✓

Point #	Position in.	Velocity Head in. H_2O	Stack Temp °F	Cyclonic Flow Angle
A-12	94.0	<0.010	1645	
11	89.6	<0.010	1662	
10	84.7	<0.010	1667	
9	79.0	<0.010	1673	
8	72.0	<0.010	1664	
7	61.8	<0.010	1656	
6	34.2	<0.010	1657	
5	24.0	<0.010	1650	
4	17.0	<0.010	1648	
3	11.3	<0.010	1650	
2	6.4	<0.010	1644	
1	2.0	<0.010	1646	
B-12		<0.010	1653	
11		<0.010	1643	
10		<0.010	1634	
9		<0.010	1638	
8		<0.010	1637	
7		<0.010	1633	
6		<0.010	1637	
5		<0.010	1650	
4		<0.010	1651	
3		<0.010	1647	
2		<0.010	1642	
1		<0.010	1641	
Average		√ΔP=	T_s=	∠=

Side View



Top View



PARTICULATE FIELD DATA

PLANT Bradley LF
DATE 4/20/05
LOCATION Simi Valley, CA
OPERATOR ML, TW
SOURCE LFG Flare #2
RUN NO. 1-SCAQMD 5.1
SAMPLE BOX NO. C-3
TIME START 0928

METER BOX NO. 7
METER ΔH @ 1.5261
Y= 1.0014
PROBE I.D. NO. 10' Enclosed
NOZZLE DIAMETER, in. 1.02
STACK DIAMETER, in. 96"
PROBE HEATER SETTING NA
HEATER BOX SETTING NA
Δ Cp FACTOR 0.84
FILTER NO. G 9002

ASSUMED MOISTURE, % 10
AMBIENT TEMPERATURE ~70°F
BARO. PRESS. 29.67
STATIC PRESS. -0.601
NOMAGRAPH INDEX 2.10.12 220

PRE TEST LEAK CHECKS
METER <0.003 @ 20 in. Hg
PITOTS ✓ @ >3/>3 in. Hg
ORSAT

P#	TIME	T_s °F	Δ P in H_2O	√Δ P	Δ H in H_2O	Vm ft³	$T_{m\,IN}$ °F	T_m OUT °F	OVEN °F	IMP. OUT °F	VAC. (in Hg)
A-12	00	1636	0.010		2.2	761.951	72	72	NA	70	4
11	2.5	1643	0.010		2.2	767.1	74	72		60	4
10	5.0	1642	0.010		2.2	769.3	76	72		58	4
9	7.5	1636	0.010		2.2	771.5	79	72		57	4
8	10.0	1647	0.010		2.2	773.7	81	72		56	4
7	12.6	1632	0.010		2.2	776.0	82	73		56	4
6	15.0	1640	0.010		2.2	778.2	82	73		55	4
5	17.6	1635	0.010		2.2	780.4	82	73		54	4
4	20.0	1659	0.010		2.2	782.6	83	74		55	4
3	22.5	1636	0.010		2.2	784.8	84	74		54	4
2	25.0	1633	0.010		2.2	787.1	84	74		56	4
1	27.6	1642	0.010		2.2	789.3	84	75		57	4
B-12	30.0	1527	0.010		2.2	791.573	75	74		64	4
11	32.6	1685	0.010		2.2	793.7	77	75		60	4
10	35.0	1680	0.010		2.2	796.1	79	75		58	4
9	37.6	1681	0.010		2.2	798.2	81	74		56	4
8	40.0	1679	0.010		2.2	800.4	83	76		56	4
7	42.5	1661	0.010		2.2	802.6	84	75		55	4
6	45.0	1663	0.010		2.2	804.7	85	75		56	4
5	47.5	1678	0.010		2.2	807.0	86	75		56	4
4	50.0	1686	0.010		2.2	809.2	87	76		56	4
3	52.6	1659	0.010		2.2	811.4	87	76		56	4
2	55.0	1673	0.010		2.2	813.6	87	76		55	4
1	57.5	1668	0.010		2.2	815.8	88	77		56	4
	60.0					818.028					
Avg.		1650.9		0.100	22	53.107		77.9			

TIME END = 1056

Volume of Liquid Water Collected	Impinger Volume 1	2	3	4	Silica Gel Wght. 5
Final	275	100	4		283
Initial	100	100	0		265
Liquid Collected	175	0	4		18
Total Vol. Collected					19.7

POST TEST LEAK CHECKS
Meter <0.003 @ 5 in. Hg
Pitots ✓ @ >3/>3 in. Hg
Orsat

Orsat Meas.	Time	CO_2	O_2	CO	N_2
1					
2					
3					

Nozzle Cal	D_1	D_2	D_3	Average
				0.59

PARTICULATE FIELD DATA

PLANT Bradley LF
DATE 4/20/05
LOCATION Simi Valley, CA
OPERATOR EE, TW
SOURCE LFG Flare #2 Exh
UNO. 2-SCAQMD 5.1
SAMPLE BOX NO. C-11

TIME START 1111

METER BOX NO. 7
METER ΔH@ 1.5261
Y= 1.0315
PROBE I.D. NO. ENGO 101
NOZZLE DIAMETER, in. 1.02
STACK DIAMETER, in. 60"
PROBE HEATER SETTING NA
HEATER BOX SETTING NA
Δ Cp FACTOR 0.84
FILTER NO. 05001

ASSUMED MOISTURE, % 10
AMBIENT TEMPERATURE 75°F
BARO. PRESS. 28.07
STATIC PRESS. -0.010
NOMAGRAPH INDEX 320

PRE TEST LEAK CHECKS
METER <0.001 @ 15 in. Hg
PITOTS ✓ @ >3" in. Hg
ORSAT

P#	TIME	T_s °F	ΔP in H_2O	√ΔP	ΔH in H_2O	Vm ft^3	$T_{m\,IN}$ °F	T_m OUT °F	OVEN °F	IMP. OUT °F	VAC. (in Hg)
A-12	00	1662	0.01		2.2	818.266	78	77	NA	72	6
11	2.5	1653	0.01		2.2	820.4	80	77		64	6
10	5.0	1656	0.01		2.2	822.6	82	77		60	6
9	7.5	1660	0.01		2.2	824.8	84	77		58	6
8	10.0	1666	0.01		2.2	827.0	86	77		57	6
7	12.5	1665	0.01		2.2	829.3	87	77		56	6
6	15.0	1676	0.01		2.2	831.4	88	77		56	6
5	17.5	1688	0.01		2.2	833.6	89	78		57	6
4	20.0	1703	0.01		2.2	835.8	88	78		56	6
3	22.5	1615	0.01		2.2	838.0	88	79		55	6
2	25.0	1702	0.01		2.2	840.2	89	79		56	6
1	27.5	1670	0.01		2.2	842.3	90	79		57	6
B-12	30.0	1659	0.01	0.468	2.2	844.6	91	79		58	6
11	32.5	1596	0.01		2.2	846.7	81	79		57	6
10	35.0	1620	0.01		2.2	848.9	87	79		56	6
9	37.5	1613	0.01		2.2	851.0	89	79		55	6
8	40.0	1616	0.01		2.2	853.2	90	80		56	6
7	42.5	1608	0.01		2.2	855.4	91	80		57	6
6	45.0	1624	0.01		2.2	857.6	92	80		56	6
5	47.5	1622	0.01		2.2	859.8	93	80		55	6
4	50.0	1620	0.01		2.2	862.0	93	81		56	6
3	52.5	1625	0.01		2.2	864.3	94	81		56	6
2	55.0	1626	0.01		2.2	866.5	93	82		56	6
1	57.5	1618	0.01		2.2	868.7	93	82		55	6
	60.0					871.013					
Avg.		1643		0.100	2.2	52.747		836			

TIME END = 1210

Volume of Liquid Water Collected	Impinger Volume 1	2	3	4	Silica Gel Wght: 5
Final	260	118	4		273
Initial	100	100	0		266
Liquid Collected	160	18	4		7
Total Vol. Collected					189

POST TEST LEAK CHECKS
Meter <0.001 @ 15 in. Hg
Pitots ✓ @ >3" in. Hg
Orsat

Orsat Meas.	Time	CO_2	O_2	CO	N_2
1					
2					
3					

Nozzle Cal	D_1	D_2	D_3	Average
				060

CEM TEMPERATURE DATA

Facility: Bradley LF
Job No.: W07-042
Source: Flare #1 Exh

Date: 4/20/05
Run #: 1

Probe Temp Settings: >250°F
Heated Line Temp Settings: >250°F

	Time	TEMPERATURES °F		
		Condenser Outlet	Probe	Teflon Line
1	00	36	>250	>250
2	10	36		
3	20	36		
4	30	36		
5	40	36		
6	50	36		
7	60	36		
8	00	36		
9	10	36		
10	20	36		
11	30	36		
12	40	36		
13	50	36		
14	60	36		
15				

HORIZON AIR MEASUREMENT SERVICES, INC.

TOTAL COMBUSTION ANALYSIS
SCAQMD METHOD 25
FIELD SAMPLING DATA SHEET

Job #: W04-042
Facility: Bradley L.F.
Location: Sun Valley
Date: 4/20/05
Operator: TW

Control Device: Flare #2 OUTLET
Sample Location: OUTLET
Ambient Temp.: 70°F ↑
Baro. Pressure: 1907

SAMPLE A

Tank #: S8 Trap #: H39
Initial Vacuum: 30" / 2.5 torr
Final Vacuum: 8.5"
Start Time: 0928

SAMPLE B

Tank #: S19 Trap #: H40
Initial Vacuum: 30" / 2.5 torr
Final Vacuum: 8"
End Time: 1039

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
00	30	
05	28.5	
10	27	
15	25	
20	23.5	
25	22	
30	20	
35	18	
40	16	
45	14	
50	12	
55	10	
60	8.5	

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
00	30	
05	29	
10	26.5	
15	25	
20	23	
25	21.5	
30	20	
35	18	
40	16	
45	14	
50	12	
55	10	
60	8	

LEAK RATE

Pre Test : √ TW
Post Test: √ TW

TOTAL COMBUSTION ANALYSIS
SCAQMD METHOD 25
FIELD SAMPLING DATA SHEET

Job #: W07-042
Facility: Bradley LF
Location: Sun Valley, CA
Date: 4/25/05
Operator: MC

Control Device: LFG Flare #2
Sample Location: Inlet
Ambient Temp.: ~70°F
Baro. Pressure: 29.10

SAMPLE A

Tank #: U Trap #: 6
Initial Vacuum: 2.5
Final Vacuum:
Start Time: 1032

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
00	29	100
05	28	100
10	27	100
15	26	100
20	25	100
25	24	100
30	23	100
35	22	100
40	21	100
45	20	100
50	19	100
55	18	100
60	17	

SAMPLE B

Tank #: T Trap #: U
Initial Vacuum: 2.5
Final Vacuum:
End Time: 1132

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
00	29	100
05	28	100
10	27	100
15	26	100
20	25	100
25	24	100
30	23	100
35	22	100
40	21	100
45	20	100
50	19	100
55	18	100
60	17	

LEAK RATE

Pre Test : ✓ / ✓
Post Test:

APPENDIX E - Calibration Information

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (525) 585-2154
Facsimile: (714) 542-8689

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER HORIZON AIR **P.O NUMBER**

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
NITRIC OXIDE	VS.SRM#2629	CC 145830	24.78 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. **COMPONENT** NITRIC OXIDE **ANALYZER MAKE-MODEL-S/N** Thermo Env. 42H S/N 42H-44979-273

ANALYTICAL PRINCIPLE CHEMILUMINESCENCE **LAST CALIBRATION DATE** 01/02/05

FIRST ANALYSIS DATE 12/30/04 **SECOND ANALYSIS DATE** 01/06/05

Z	0.1	R	24.0	C	12.5	CONC. 12.9	Z	-0.1	R	24.8	C 12.7	CONC. 12.7
R	24.3	Z	0.1	C	12.7	CONC. 12.9	R	24.9	Z	-0.1	C 12.7	CONC. 12.7
Z	0.1	C	12.7	R	24.4	CONC. 12.8	Z	0.0	C	12.6	R 24.9	CONC. 12.6

U/M ppm **MEAN TEST ASSAY** 12.9 **U/M** ppm **MEAN TEST ASSAY** 12.7

VALUE NOT VALID BELOW 150 PSIG. NOx VALUE FOR REFERENCE ONLY.

THIS CYLINDER NO. SA 16697
HAS BEEN CERTIFIED ACCORDING TO SECTION EPA-600/R97/121
OF TRACEABILITY PROTOCOL NO. REV. 9/97
PROCEDURE G1
CERTIFIED ACCURACY ± 1 **% NIST TRACEABLE**
CYLINDER PRESSURE 2000 **PSIG**
CERTIFICATION DATE 01/06/05
EXPIRATION DATE 01/06/07 **TERM** 24 MONTHS

CERTIFIED CONCENTRATION

NITRIC OXIDE	12.8 ppm
NITROGEN	BALANCE
NOx	13.0 ppm

ANALYZED BY PHIL KIM ***CERTIFIED BY*** JOSEPH CHARLES

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (325) 585-2154
Facsimile: (714) 542-6689

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER HORIZON AIR **P.O NUMBER**

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
NITRIC OXIDE	vs.SRM#2629	CC 144870	24.81 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. **COMPONENT** NITRIC OXIDE **ANALYZER MAKE-MODEL-S/N** Thermo Env. 42H S/N 42H-44979-273

ANALYTICAL PRINCIPLE CHEMILUMINESCENCE **LAST CALIBRATION DATE** 11/02/04

FIRST ANALYSIS DATE 11/02/04 **SECOND ANALYSIS DATE** 11/09/04

Z	0.0	R	24.1	C	18.8	CONC.	19.4	Z	0.1	R	24.0	C	18.8	CONC. 19.4
R	24.1	Z	0.0	C	18.8	CONC.	19.4	R	24.0	Z	0.1	C	18.9	CONC. 19.5
Z	0.0	C	18.8	R	24.1	CONC.	19.4	Z	0.1	C	18.9	R	24.0	CONC. 19.5

U/M ppm **MEAN TEST ASSAY** 19.4 **U/M** ppm **MEAN TEST ASSAY** 19.5

VALUE NOT VALID BELOW 150 PSIG. NOx VALUE FOR REFERENCE ONLY.
LAST ANALYSIS: NO=20.2 ppm 9/20/02

THIS CYLINDER NO. CC 150203
HAS BEEN CERTIFIED ACCORDING TO SECTION EPA-600/R97/121
OF TRACEABILITY PROTOCOL NO. REV. 9/97
PROCEDURE G1
CERTIFIED ACCURACY ± 1 **% NIST TRACEABLE**
CYLINDER PRESSURE 1000 **PSIG**
CERTIFICATION DATE 11/09/04
EXPIRATION DATE 11/09/06 **TERM** 24 MONTHS

CERTIFIED CONCENTRATION

NITRIC OXIDE	19.4 ppm
NITROGEN	BALANCE
NOx	20.0 ppm

ANALYZED BY Joseph Charles JOSEPH CHARLES (AT)

CERTIFIED BY PHIL KIM

PRAXAIR

Praxair Distribution, Inc.
5700 S. Alameda Street
Los Angeles, CA 90058
Tel: 323-585-2154
Fax: 714-542-6689

6/9/04

Horizon Air
996 LAWRENCE DR STE 108
NEWBURY PARK, CA 91320
USA

Attention: HORIZON AIR MEASUREMENTS

Praxair Order No. **953055-00**
Customer Reference No.

Product Lot/Batch No. **109326903**
Praxair Part No. **EV NINX19MP-AS**

CERTIFICATE OF ANALYSIS
Primary Standard

Component	Requested Concentration	Certified Concentration	Analytical Principle	Analytical Accuracy
Nitrogen dioxide (AS NOX)	**19 ppm**	**18.5 ppm**	**A**	**±1 %**
Nitrogen		**balance**		

Analytical Instruments: **Thermo Environmental~42H~Chemiluminescence~Other**
Cylinder Style: **AS**
Cylinder Pressure @70F: **1700 psig**
Cylinder Volume: **122 ft3**
Valve Outlet Connection: **660**
Cylinder No(s). **CC 149665**
Comments: **NO=0.5 ppm VALUE IS FOR REFERENCE ONLY.**

Filling Method: **Gravimetric**
Date of Fill: **9/25/03**
Expiration Date: **6/8/06**

Analyst: **Joseph Charles**

QA Reviewer: **Phu Tien Nguyen**

The gas calibration cylinder standard prepared by Praxair Distribution is considered a certified standard. It is prepared by gravimetric, volumetric, or partial pressure techniques. The calibration standard provided is certified against Praxair Reference Materials which are either prepared by weights traceable to the National Institute of Standards and Technology (NIST) or by using NIST Standard Reference Materials where available.

Note: All expressions for concentration (e.g., % or ppm) are for gas phase, by volume (e.g., ppmv) unless otherwise noted.

Key to Analytical Techniques:
A Chemiluminescence B Gravimetric C Electrolytic Cell D Photolonization HNU
E Pulsed Fluorescence F Ultra Violet Spectrometry

067

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles. CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER HORIZON AIR MEASUREMENTS **P.O NUMBER** 8565

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
CARBON MONOXIDE GMIS	VS.SRM#1678	CC 160092	51.1 ppm
NITRIC OXIDE GMIS	1683b	SA 7757	49.7 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. **COMPONENT** CARBON MONOXIDE GMIS **ANALYZER MAKE-MODEL-S/N** Siemens Ultramat 5E S/N A12-729
   ANALYTICAL PRINCIPLE NDIR **LAST CALIBRATION DATE** 03/19/05
   FIRST ANALYSIS DATE 02/20/05 **SECOND ANALYSIS DATE** 03/28/05

Z 0.0	R 51.1	C 50.6	CONC. 50.6		Z 0.0	R 51.1	C 50.8	CONC. 50.8	
R 51.1	Z 0.0	C 50.7	CONC. 50.7		R 51.2	Z 0.0	C 51.0	CONC. 50.9	
Z 0.0	C 50.6	R 51.1	CONC. 50.6		Z 0.0	C 51.0	R 51.2	CONC. 50.9	
U/M ppm		MEAN TEST ASSAY	50.6 ppm		U/M ppm		MEAN TEST ASSAY	50.9 ppm	

2. **COMPONENT** NITRIC OXIDE GMIS **ANALYZER MAKE-MODEL-S/N** BECKMAN 951A S/N#0101354
   ANALYTICAL PRINCIPLE CHEMILUMINESCENCE **LAST CALIBRATION DATE** 03/01/05
   FIRST ANALYSIS DATE 02/20/05 **SECOND ANALYSIS DATE** 03/28/05

Z 0.0	R 479.6	C 486.3	CONC. 50.4		Z 0.0	R 471.0	C 478.0	CONC. 50.4	
R 479.1	Z 0.0	C 486.3	CONC. 50.4		R 470.4	Z 0.0	C 478.3	CONC. 50.5	
Z 0.0	C 486.6	R 478.6	CONC. 50.5		Z 0.0	C 478.6	R 471.0	CONC. 50.5	
U/M mV		MEAN TEST ASSAY	50.4 ppm		U/M mV		MEAN TEST ASSAY	50.5 ppm	

NOx value solely for reference use. Values not valid below 150 psig.

THIS CYLINDER NO. CC 110519
HAS BEEN CERTIFIED ACCORDING TO SECTION EPA-600/R97/121
OF TRACEABILITY PROTOCOL NO. Rev. 9/97
PROCEDURE G1
CERTIFIED ACCURACY ± 1 **% NIST TRACEABLE**
CYLINDER PRESSURE 2000 **PSIG**
CERTIFICATION DATE 03/28/05
EXPIRATION DATE 03/28/07 **TERM** 24 MONTHS

CERTIFIED CONCENTRATION

CARBON MONOXIDE	50.8 ppm
NITRIC OXIDE	50.4 ppm
NITROGEN	BALANCE
NOx	51.1 ppm

ANALYZED BY CHRIS VU ***CERTIFIED BY*** MICHAEL TSANG

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (525) 585-2154
Facsimile: (714) 542-6689

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER HORIZON AIR MEASUREMENTS P.O NUMBER 8488

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
NITRIC OXIDE GMIS	vsSRM#1684b	CC 136077	99.1 ppm
CARBON MONOXIDE GMIS	vs.SRM#1679	CC 160064	101.3 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. COMPONENT NITRIC OXIDE GMIS ANALYZER MAKE-MODEL-S/N BECKMAN 951A S/N#0101354
   ANALYTICAL PRINCIPLE CHEMILUMINESCENCE LAST CALIBRATION DATE 11/01/04
   FIRST ANALYSIS DATE 11/24/04 SECOND ANALYSIS DATE

Z 0.0	R 948.0	C 766.8	CONC. 80.2	Z	R	C	CONC.
R 947.2	Z 0.0	C 765.9	CONC. 80.1	R	Z	C	CONC.
Z 0.0	C 767.2	R 948.0	CONC. 80.2	Z	C	R	CONC.

U/M mV MEAN TEST ASSAY 80.2 U/M mV MEAN TEST ASSAY

2. COMPONENT CARBON MONOXIDE GMIS ANALYZER MAKE MODEL-S/N HORIBA, VIA-510, S/N 576876015
   ANALYTICAL PRINCIPLE NDIR LAST CALIBRATION DATE 11/02/04
   FIRST ANALYSIS DATE 11/24/04 SECOND ANALYSIS DATE

Z 0.0	R 101.3	C 80.1	CONC. 80.1	Z	R	C	CONC.
R 101.3	Z 0.0	C 80.0	CONC. 80.0	R	Z	C	CONC.
Z 0.0	C 80.1	R 101.3	CONC. 80.1	Z	C	R	CONC.

U/M ppm MEAN TEST ASSAY 80.1 U/M ppm MEAN TEST ASSAY

VALUES NOT VALID BELOW 150 PSIG
LAST ASSAY DATE AND RESULTS: 11/23/02, 81.0 ppm NO, 80.4 ppm CO, 81.1 ppm NOx.

THIS CYLINDER NO. CC 138486
HAS BEEN CERTIFIED ACCORDING TO SECTION EPA-600/R97/121
OF TRACEABILITY PROTOCOL NO. REV 9/97
PROCEDURE G1
CERTIFIED ACCURACY ± 1 % NIST TRACEABLE
CYLINDER PRESSURE 1500 PSIG
CERTIFICATION DATE 11/24/04
EXPIRATION DATE 11/24/06 TERM 24 MONTHS

CERTIFIED CONCENTRATION

NITRIC OXIDE	80.6 ppm
CARBON MONOXIDE	80.2 ppm
NITROGEN	BALANCE
NOx	81.0 ppm

ANALYZED BY MICHAEL TSANG

CERTIFIED BY CHRIS VU

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6669

3/10/05

Horizon Air
996 Lawrence Dr Ste 108
Newbury Park, CA
USA 91320

Attention: Deborah Vacherst

Praxair Order No. **43172600**
Customer Reference No.

Product Lot/Batch No. **109434618**
Praxair Part No. **EV NICDOXP1-AS**

CERTIFICATE OF ANALYSIS
Primary Standard

Component	Requested Concentration	Certified Concentration	Analytical Principle	Analytical Accuracy
Carbon dioxide	**7 %**	**6.99 %**	**V**	**±0.02 % abs.**
Oxygen	**12 %**	**12.05 %**		**±0.02 % abs.**
Nitrogen	**balance**	**balance**		

Analytical Instruments: **Mettler~ID5~Gravimetric**
Cylinder Style: **AS**
Cylinder Pressure @70F: **2000 psig**
Cylinder Volume: **148 ft3**
Valve Outlet Connection: **590**
Cylinder No(s). **CC 144975**

Filling Method: **Gravimetric**
Date of Fill: **12/11/04**
Expiration Date: **3/9/08**

Analyst: **Jack Fu**

QA Reviewer: **Ty Triplett**

The gas calibration cylinder standard prepared by Praxair Distribution is considered a certified standard. It is prepared by gravimetric, volumetric, or partial pressure techniques. The calibration standard provided is certified against Praxair Reference Materials which are either prepared by weights traceable to the National Institute of Standards and Technology (NIST) or by using NIST Standard Reference Materials where available.

Note: All expressions for concentration (e.g., % or ppm) are for gas phase, by volume (e.g., ppmv) unless otherwise noted.

Key to Analytical Techniques:

A	Flame Ionization with Methanizer	B	Gas Chromatography with Discharge Ionization Detector	C	Gas Chromatography with Electrolytic Conductivity Detector	D	Gas Chromatography with Flame Ionization Detector
E	Gas Chromatography with Flame Photometric Detector	F	Gas Chromatography with Helium Ionization Detector	G	Gas Chromatography with Methanizer Carbonizer	H	Gas Chromatography with Photoionization Detector
I	Gas Chromatography with Reduction Gas Analyzer	J	Gas Chromatography with Thermal Conductivity Detector	K	Gas Chromatography with Ultrasonic Detector	L	Infrared - FTIR or NDIR
M	Mass Spectrometry - MS or GC/MS	N	Proprietary	O	Paramagnetic	P	Specific Water Analyzer
Q	Total Hydrocarbon Analyzer	R	Wet Chemical	S	Detector Tube	T	Odor
U	Chemiluminescence	V	Gravimetric	W	Electrolytic Cell/Electrochemical	X	Photoionization
Y	Pulsed Fluorescence	Z	UV Spectrometry				

070

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5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

CERTIFICATE OF ANALYSIS

CUSTOMER HORIZON AIR MEASUREMENTS

DATE 05/12/04

P.O NUMBER

REF. NUMBER 67757400

REQUESTED COMPOSITION

GAS	CONCENTRATION
CARBON DIOXIDE	12 %
OXYGEN	20 %
NITROGEN	BALANCE
ANALYTICAL ACCURACY	±0.02%abs

ANALYTICAL METHOD

INSTRUMENT	ANALYTICAL PRINCIPLE
Mettler ID5, S/N:1865166	Gravimetric
Mettler ID5, S/N:1865166	Gravimetric

Values not valid below 150 psig.

THIS CYLINDER NO.	SA 20202
CYLINDER PRESSURE	2000 **PSIG**
EXPIRATION DATE	12/31/07
CLASSIFICATION	PRIMARY STANDARD
BATCH NUMBER	N/A
LOT NUMBER	109413306
PART NUMBER	NI CDOXP80-AS
CYLINDER SIZE	AS **CGA** 590 152 **CFT**

CERTIFIED CONCENTRATION

CARBON DIOXIDE	12.01 %
OXYGEN	20.01 %
NITROGEN	BALANCE
ANALYTICAL ACCURACY	±0.02%abs

ANALYZED BY JACK SU

CERTIFIED BY TY TRIPLETT

Magnehelic Gauge Calibration Data

Range: 0 - 5.0"

Date: 01/05/2004

Calibrated by: F.Torres

BAROMETRIC PRESURE: 29.12

Reference: 0.0-10.0 Manometer

SYSTEM
LEAK CHECKS (Y/N): Y

POINT
LEAK CHECK (Y/N): Y

Magnahelic Box 3

Serial # R980817MLG44

MAG	MAN R1	MAN R2	MAN R3	MEAN	MEAN/MAG
1.00	1.00	1.00	1.00	1.000	1.000
2.00	2.00	2.00	2.00	2.000	1.000
3.00	3.00	3.00	3.00	3.000	1.000
4.00	4.00	4.00	4.00	4.000	1.000
5.00	5.00	5.00	5.00	5.000	1.000

Correction Factor: 1.0000

Control Box Calibration Data

Date: 01/04/05

Calibrated by: Bill Jones

Meter Box Number: 5

Barometric Pressure: 28.86

Wet Test Meter Cf: 0.9971

Orifice setting (H)	Gas Volumes: Wet Test (cu.ft)	Gas Volumes: Dry Gas Initial (cu.ft)	Gas Volumes: Dry Gas Final (cu.ft)	Temperatures: DGM Initial (°F)	Temperatures: DGM final (°F)	Temperatures: WTM (°F)	Time (min)	Y	H@
0.5	11.222	522.269	533.248	70	76	72	26	1.0198	1.5746
1.0	11.378	510.809	522.085	71	77	70	19	1.0107	1.6213
1.5	13.744	496.934	510.587	70	77	69	19	1.0084	1.6612
2.0	11.609	485.229	496.707	69	76	69	14	1.0095	1.6896
3.0	11.294	473.941	485.076	67	74	68	11	1.0084	1.6523
4.0	11.828	462.225	473.775	64	71	68	10	1.0094	1.6702
						AVERAGE		1.0110	1.6449

Reviewed by:

Control Box Calibration Data

Date: 01/03/05

Calibrated by: Bill Jones

Meter Box Number: 7

Barometric Pressure: 28.94

Wet Test Meter Cf: 0.9971

Orifice setting (H)	Gas Volumes: Wet Test (cu.ft)	Gas Volumes: Dry Gas Initial (cu.ft)	Gas Volumes: Dry Gas Final (cu.ft)	Temperatures: DGM Initial (°F)	Temperatures: DGM final (°F)	Temperatures: WTM (°F)	Time (min)	Y	H@
0.5	11.017	599.764	610.945	74	76	60	25	1.0091	1.4344
1.0	10.975	588.339	599.496	74	77	60	18	1.0070	1.4972
1.5	11.778	576.038	588.000	71	77	60	16	1.0044	1.5443
2.0	11.830	563.839	575.848	69	75	60	14	0.9998	1.5685
3.0	11.475	551.870	563.440	66	73	60	11	0.9989	1.5518
4.0	12.078	539.424	551.553	58	69	60	10	0.9895	1.5604
						AVERAGE		1.0015	1.5261

Reviewed by:

probe 10-1

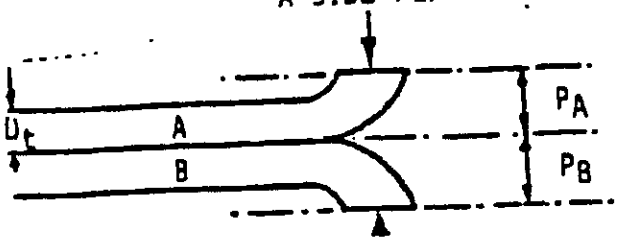
TYPE S PITOT TUBE INSPECTION DATA FORM

Tubing diameter, D_t 0.362 in.

Pitot Tube Assembly Level? (Yes) / No

Pitot Tube Openings Damaged? Yes / (No)

A-SIDE PLANE



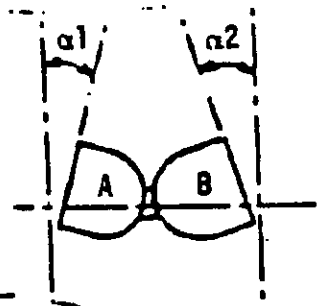
NOTE: 0.986

$1.05\ D_t < P < 1.50\ D_t$

$P_A = P_B$

P_A = 0.493 in.

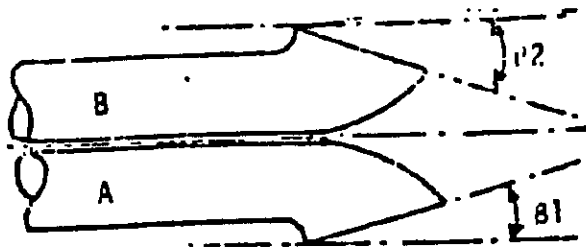
P_B = 0.493 in.



α_1 = 2 °

α_2 = 2 °

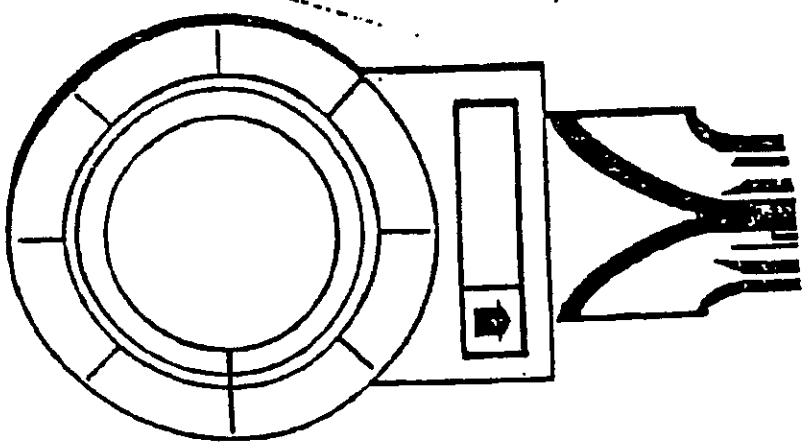
(<10°)

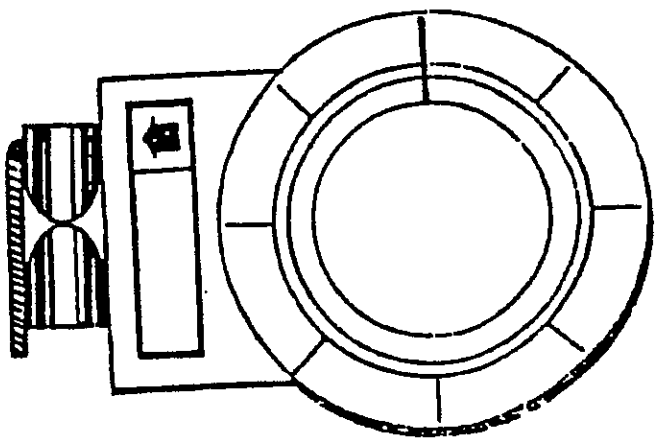


S_1 1.0

B_2 1.0

(< 5°)





Level Position to Find γ = 1.5

Z = A sin γ 0.026 in. (< 1/8 in.)

Level Position to find θ 1.5

W = A sin θ = 0.026 in. (< 1/32

Comments _____

Checked by: _____ Date: 4-6-05

Calibration Required? NO

075

STACK TEMPERATURE SENSOR CALIBRATION DATA- APEX PROBE ASSEMBLIES

Date: 01/10/05
Calibrated by: B. Jones

THERMOCOUPLE ID:

	ICE WATER						ABSOLUTE T DIFF., %			BOILING WATER						ABSOLUTE T DIFF., %			BOILING OIL						ABSOLUTE T DIFF., %		
	REF			TC						REF			TC						REF			TC					
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Stainless Steel Probes																											
3-1	32	32	32	30	30	30	0.4	0.4	0.4	212	212	212	211	211	210	0.1	0.1	0.3	536	536	536	534	534	535	0.2	0.2	0.1
4-2	32	32	32	31	31	31	0.2	0.2	0.2	212	212	212	210	209	210	0.3	0.4	0.3	535	534	534	535	533	532	0.0	0.1	0.2
4-3	32	32	32	30	31	31	0.4	0.2	0.2	212	212	212	211	210	210	0.1	0.3	0.3	547	548	548	544	545	546	0.3	0.3	0.2
6-2	31	32	32	31	31	30	0.0	0.2	0.4	210	211	211	208	209	210	0.3	0.3	0.0	535	535	535	536	534	534	-0.1	0.1	0.1
6-3	32	32	32	31	31	31	0.2	0.2	0.2	212	212	212	210	210	210	0.3	0.3	0.3	535	536	536	536	535	535	-0.1	0.1	0.1
6-4	32	31	32	31	30	30	0.2	0.2	0.4	212	212	212	211	211	211	0.2	0.1	0.1	535	534	538	536	533	535	-0.1	0.1	0.3
A6-5	32	32	32	31	31	31	0.2	0.2	0.2	212	212	212	211	211	210	0.1	0.1	0.3	540	539	539	537	537	537	0.3	0.2	0.2
A8-1	32	32	31	31	30	31	0.2	0.4	0.0	212	212	212	211	211	211	0.1	0.1	0.1	536	537	537	536	535	535	0.0	0.2	0.2
A8-2	32	32	32	30	31	31	0.4	0.2	0.2	212	212	212	210	210	210	0.3	0.3	0.3	537	537	535	536	536	533	0.1	0.1	0.2
A8-3	32	32	32	31	31	31	0.2	0.2	0.2	212	212	212	211	211	211	0.1	0.1	0.1	550	550	550	549	549	550	0.1	0.1	0.0
10-1	32	32	32	31	31	31	0.2	0.2	0.2	212	212	212	211	211	211	0.1	0.1	0.1	536	537	536	533	533	533	0.3	0.4	0.3
M17-2	32	32	32	31	31	30	0.2	0.2	0.4	212	212	212	211	211	211	0.1	0.1	0.1	536	536	535	536	535	533	0.0	0.1	0.2
M17-3	32	32	32	31	31	31	0.2	0.2	0.2	212	212	212	210	211	211	0.3	0.1	0.1	534	536	535	533	535	536	0.1	0.1	-0.1
Inconel																											
10-1 Inc	32	32	32	30	31	32	0.4	0.2	0.0	212	212	212	210	211	211	0.3	0.1	0.1	548	548	548	545	548	544	0.3	0.0	0.4
6-1 Inc	32	32	32	30	30	31	0.4	0.4	0.2	212	212	212	211	211	211	0.1	0.1	0.1	550	550	550	548	548	548	0.2	0.2	0.2
Loose Thermocouple																											
6-5	32	32	32	33	30	31	-0.2	0.4	0.2	212	212	212	209	211	210	0.4	0.1	0.3	532	533	533	530	531	530	0.2	0.2	0.3
6-8	32	32	32	30	31	31	0.4	0.2	0.2	212	212	212	210	211	212	0.3	0.1	0.0	548	549	549	545	545	545	0.3	0.4	0.4
7-1	32	32	32	30	30	30	0.4	0.4	0.4	212	212	212	210	210	210	0.3	0.3	0.3	533	534	536	531	533	536	0.2	0.1	0.0
8-3	32	32	32	31	31	31	0.2	0.2	0.2	212	212	212	211	211	211	0.1	0.1	0.1	550	550	550	549	549	550	0.1	0.1	0.0

Note: If absolute temperature values of the reference thermometer being calibrated and the stack temperature sensors agree within 1.5 percent at each of the three calibration p no correction is needed.

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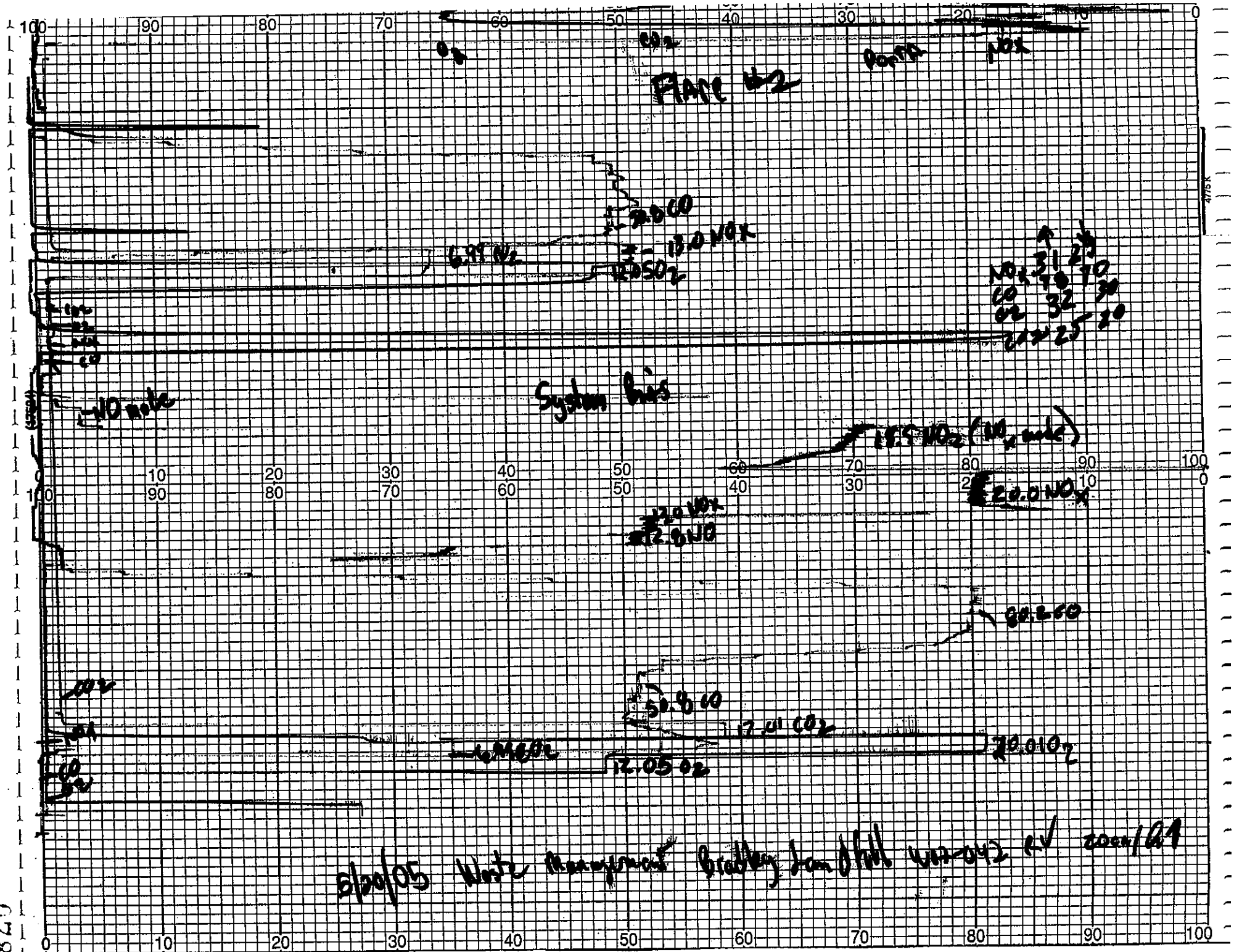
APPENDIX F - Strip Chart Data


Flare #2
System Bias
5/20/05 Waste Management Bradley Landfill

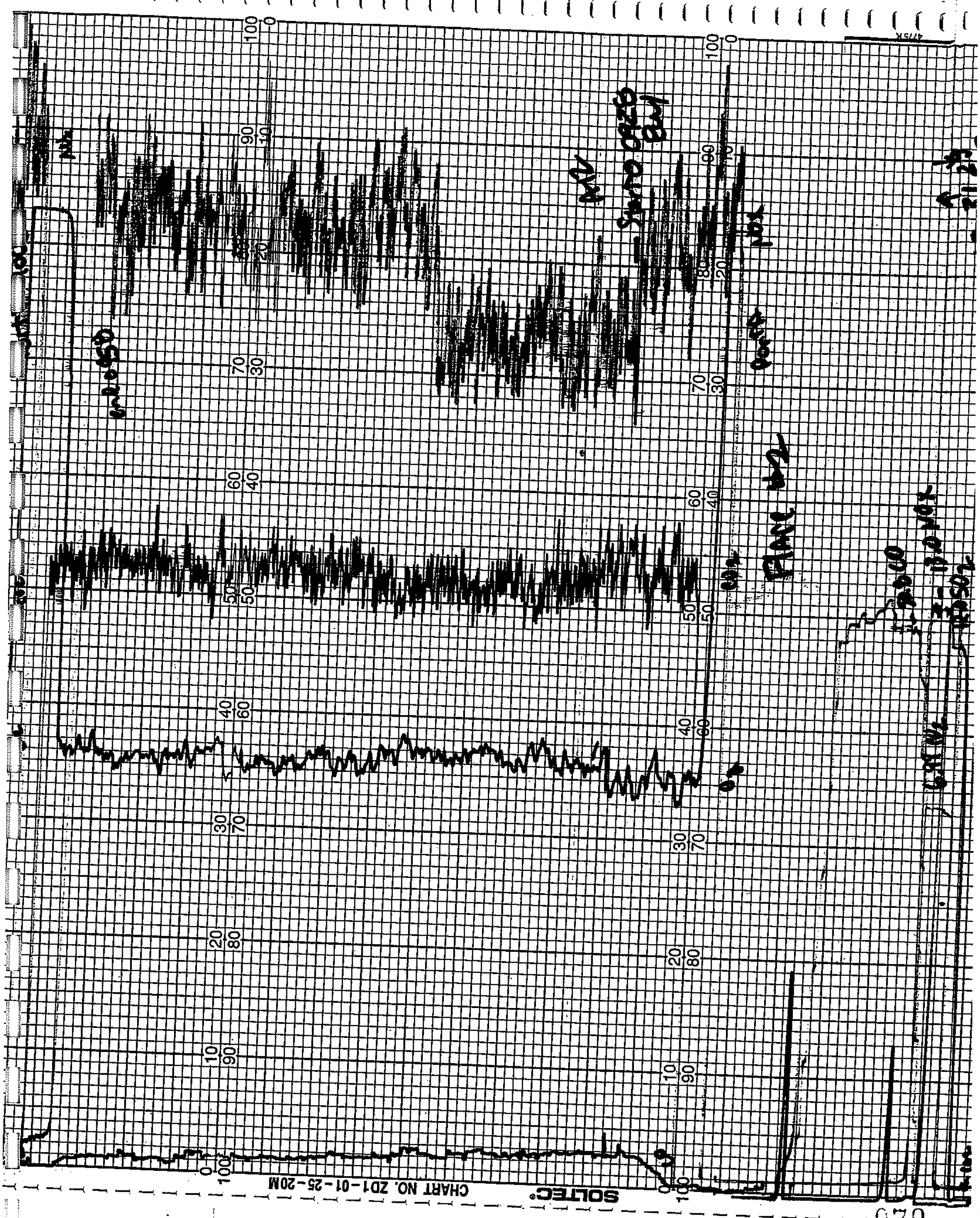
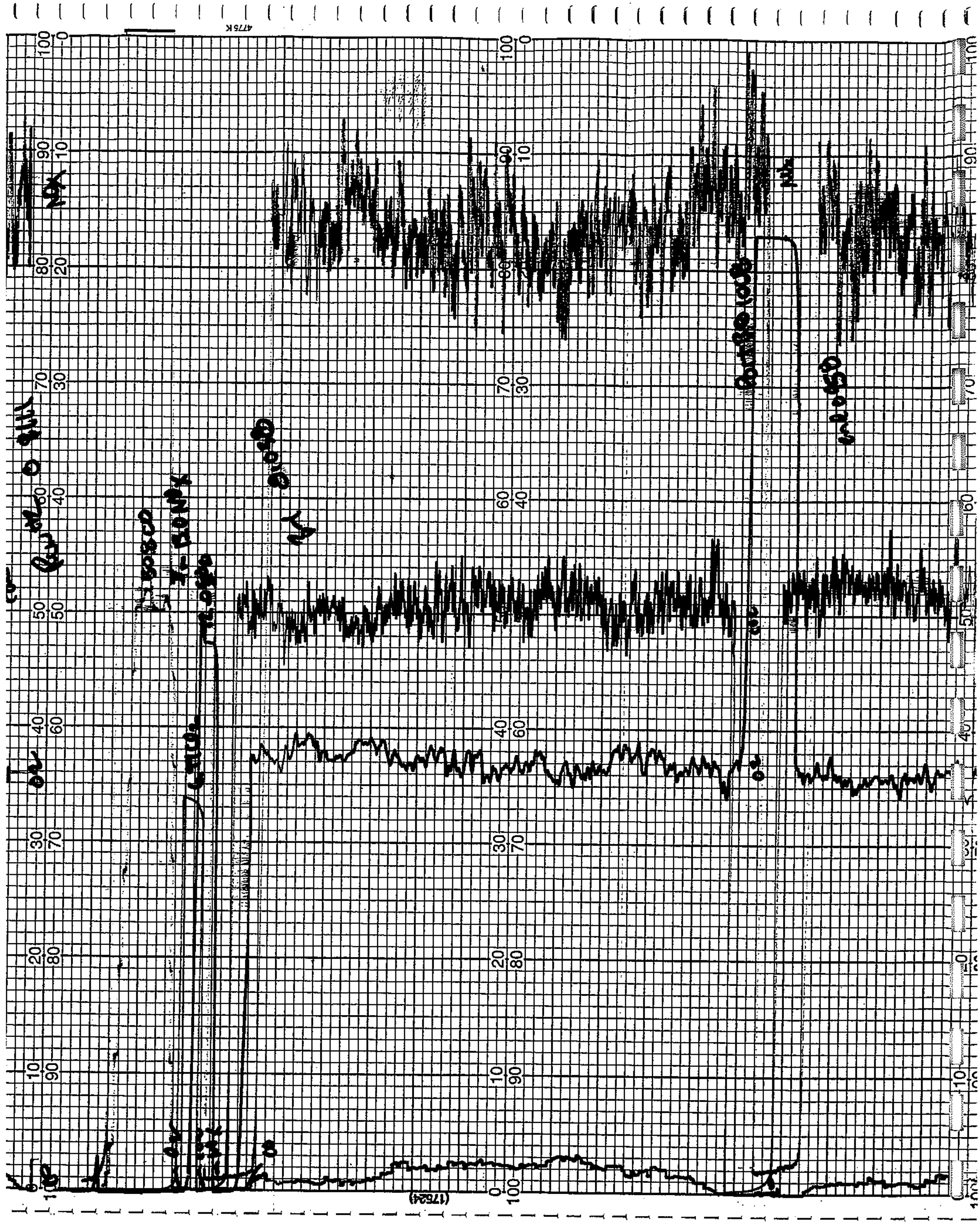
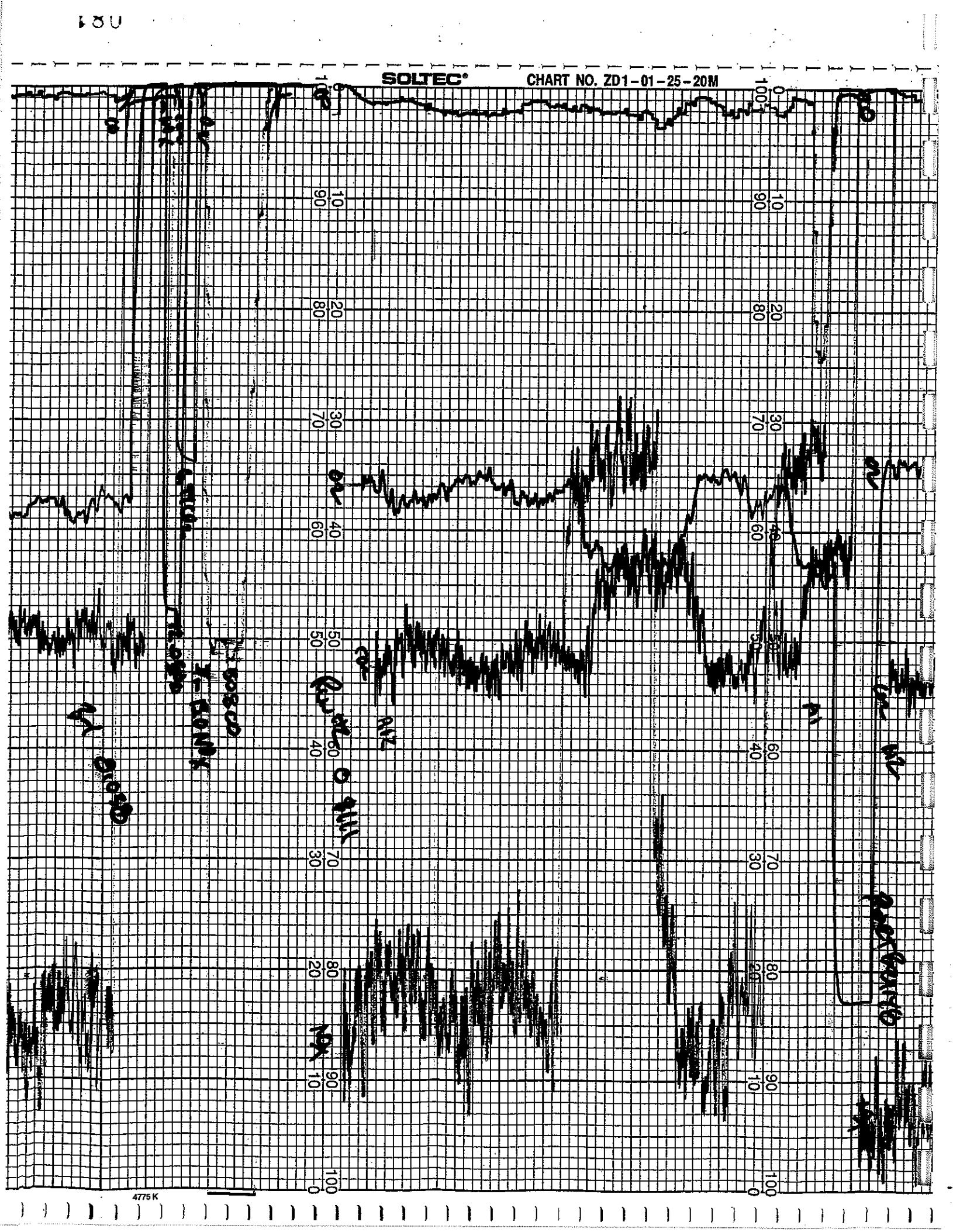
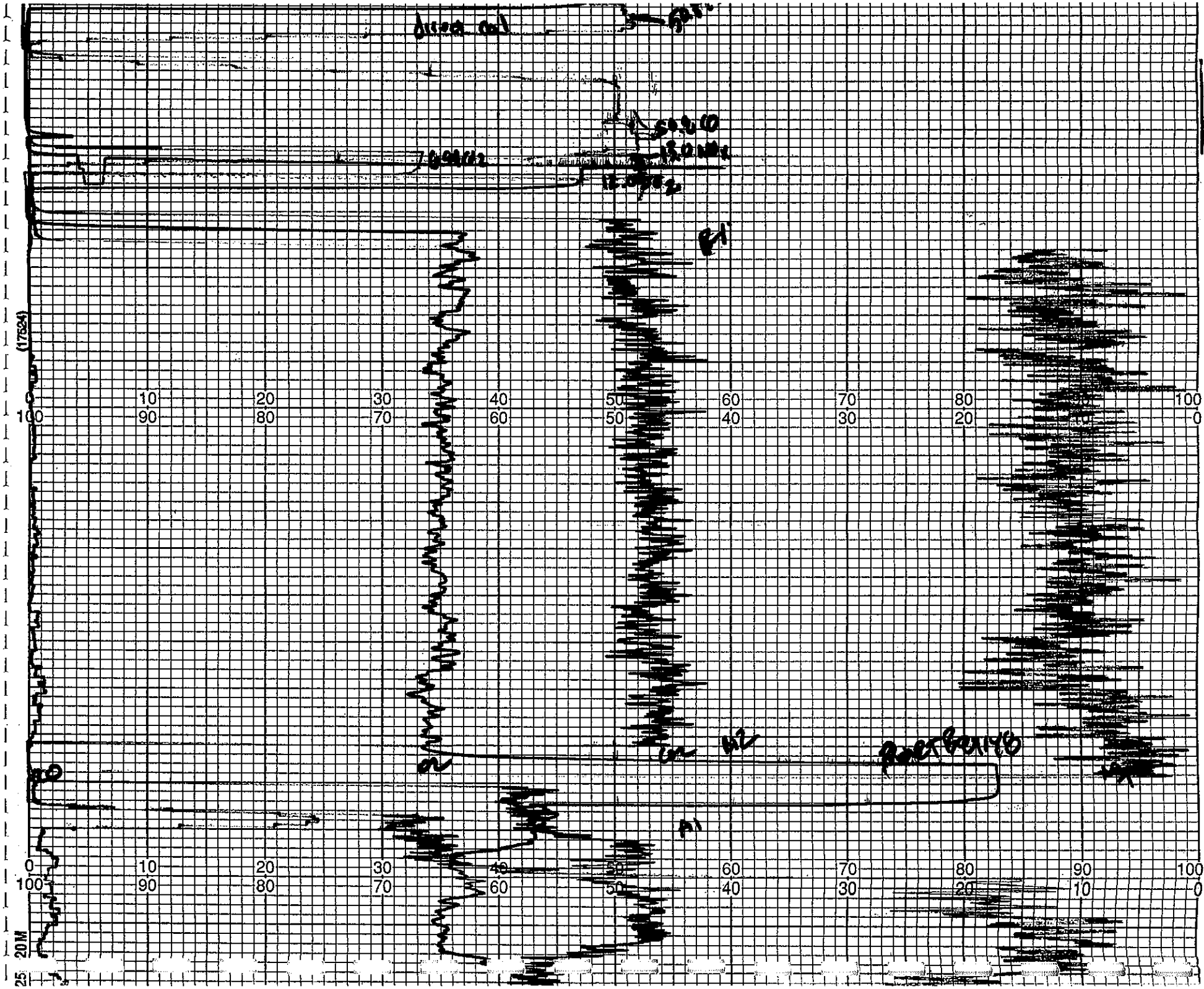
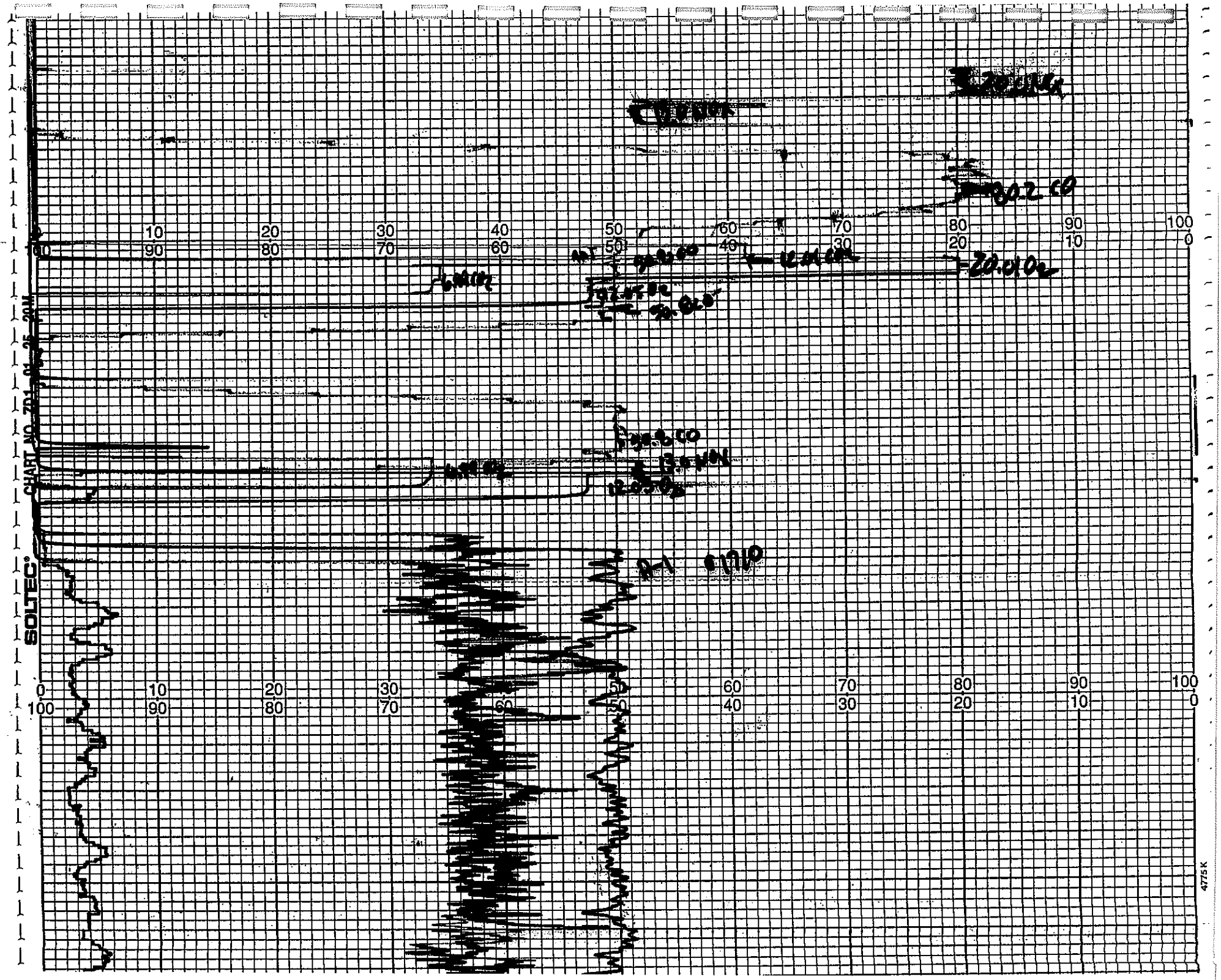


CHART NO. ZD1-01-25-20M
SOLTEC




SOLTEC®
CHART NO. ZD1-01-25-20M
4775K


(1782A)
0 10 20 30 40 50 60 70 80 100
100 90 80 70 60 50 40 30 20 0
0 10 20 30 40 50 60 70 80 90 100
100 90 80 70 60 50 40 30 20 10 0
20M
25


SOLTEC
CHART NO. 701-01-25-20M
10 90
20 80
30 70
40 60
50 50
60 40
70 30
80 20
90 10
100 0
0 100
4775 K

APPENDIX G - Process Data

OPERATING DATA
FOR LANDFILL FLARES

Facility: Bradley Landfill Date: 4/20/05

Job No.: W07-042 Run #: 1/2

Source: Flare #2

Time	Landfill Gas Flow (scfm)	Condensate Injection (gpm)	Flare Temerature (°F)	Fuel Pressure ( )	Fuel Temp (°F)
Run #1 0930	1764	3.4	1577		
0940	1776	3.4	1573		
0950	1752	4.0	1578		
1000	1776	3.9	1578		
1010	1753	3.9	1573		
1020	1752	3.9	1575		
1030/1040	1740/1750	3.9/3.9	1573/1575		
1110 Rn #2	1764	4.3	1579		
1120	1763	4.3	1580		
1130	1764	0.0	1572		
1140	1760/1766	4.4	1573		
1150	1776	4.3	1569		
1200	1764	4.3	1569		
1210	1776	4.3	1571		
0220	1764	4.3	1570		

Run 1 Avg – 1758 scfm
3.8 gpm
1575 °F

Run 2 Avg. – 1767 scfm
3.8 gpm
1572 °F

APPENDIX H - Permit to Operate

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 East Copley Drive, Diamond Bar, CA 91765

PERMIT TO OPERATE

This initial permit must be renewed ANNUALLY unless the equipment is moved, or changes ownership.
If the billing for the annual renewal fee (Rule 301.f) is not received by the expiration date, contact the District.

Legal Owner
or Operator:

WASTE MGMT DISPOSAL&RECYCLING SERVS INC
9081 TUJUNGA AVE
SUN VALLEY, CA 91352

ID 50310

Equipment Location: 9227 TUJUNGA AVE, SUN VALLEY, CA 91352-1542

Equipment Description :

LANDFILL GAS FLARING SYSTEM NO. 2 CONSISTING OF:

1. INLET SEPARATOR , LANDFILL GAS, TEXAS PIPE FABRICATORS, 2'-6" DIA. X 13'-7" H.
2. PARTICULATE SCRUBBER, LANDFILL GAS, TEXAS PIPE FABRICATORS, 2'-6" DIA. X 9'-3" H.
3. TWO BLOWERS, LANDFILL GAS, EACH 30 H.P.
4. FLARE NO. 2, JOHN ZINK, 8'-0" DIA. X 50'-0" H, WITH A MULTIJET BURNER, A PROPANE GAS PILOT, ELECTRIC IGNITER, UV FLAMESENSOR, THERMOCOUPLE WITH TEMPERATURE INDICATOR AND RECORDER, AUTOMATIC SHUTDOWN AND ALARM SYSTEM, AUTOMATIC COMBUSTION AIR REGULATING SYSTEM, TEMPERATURE CONTROLLER, FLAME ARRESTOR AND FIVE CONDENSATE INJECTION GUNS.

Conditions :

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.
2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.
3. THIS EQUIPMENT SHALL BE OPERATED AND MAINTAINED BY PERSONNEL PROPERLY TRAINED IN ITS OPERATION.
4. THE FLARE SHALL BE EQUIPPED WITH A TEMPERATURE INDICATOR AND RECORDER WHICH MEASURES AND RECORDS THE GAS TEMPERATURE (IN DEGREES F) IN THE FLARE STACK. THE TEMPERATURE INDICATOR AND RECORDER SHALL OPERATE WHENEVER THE FLARE IS IN OPERATION.

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5. WHENEVER THE FLARE IS IN OPERATION, EXCEPT DURING START-UP, A TEMPERATURE OF NOT LESS THAN 1400 DEGREES F, AS MEASURED BY THE TEMPERATURE INDICATOR AND RECORDER, SHALL BE MAINTAINED IN THE FLARE STACK. THE THERMOCOUPLE USED TO MEASURE THE TEMPERATURE SHALL BE ABOVE THE FLAME ZONE AND AT LEAST 3 FEET BELOW THE TOP OF THE FLARE SHROUD AND AT LEAST 0.6 SECONDS DOWNSTREAM OF THE BURNER.

6. A FLOW INDICATING AND RECORDING DEVICE SHALL BE MAINTAINED IN THE LANDFILL GAS SUPPLY LINE TO THE FLARE TO MEASURE AND RECORD THE QUANTITY OF LANDFILL GAS (IN SCFM) BEING BURNED.

7. THE HEAT RELEASE FROM THE LANDFILL GAS BURNED IN THE FLARE SHALL NOT EXCEED 62 MM BTU/HR.

8. THE BTU CONTENT OF THE LANDFILL GAS SHALL BE MEASURED USING AN INSTRUMENT APPROVED BY THE AQMD AND RECORDED DAILY.

9. WHENEVER THE CONDENSATE INJECTION STATION IS IN OPERATION, NOT MORE THAN 5 GALLONS PER MINUTE OF CONDENSATE SHALL BE INJECTED INTO THE FLARE.

10. A FLOW INDICATOR AND RECORDER SHALL BE INSTALLED IN THE CONDENSATE INJECTION STATION AND SHALL OPERATE WHENEVER THE CONDENSATE INJECTION STATION IS IN OPERATION.

11. ALL RECORDING DEVICES SHALL BE SYNCHRONIZED WITH RESPECT TO THE TIME OF DAY.

12. THE FLARE SHALL BE EQUIPPED WITH A FLARE FAILURE ALARM WITH AN AUTOMATIC BLOWER SHUT-OFF SYSTEM.

13. THE FLARE FAILURE ALARM WITH THE AUTOMATIC BLOWER SHUT-OFF SYSTEM SHALL BE TESTED ANNUALLY FOR PROPER OPERATION AND RESULTS RECORDED.

14. A PRESSURE DIFFERENTIAL INDICATOR SHALL BE MAINTAINED ACROSS THE FLAME ARRESTOR.

15. A SUFFICIENT NUMBER OF SIGHT GLASS WINDOWS SHALL BE INSTALLED IN THE FLARE TO ALLOW VISUAL INSPECTION OF THE FLAME AND THERMOCOUPLE LOCATION WITHIN THE FLARE AT ALL TIMES. ADEQUATE AND SAFE ACCESS SHALL BE PROVIDED FOR ALL PORTS UPON REQUEST BY AQMD PERSONNEL.

16. A SET OF FOUR SAMPLING PORTS SHALL BE INSTALLED IN THE FLARE SHROUD AND LOCATED AT LEAST TWO FEET ABOVE THE FLAME ZONE AND AT LEAST THREE FEET BELOW THE TOP OF THE FLARE SHROUD. EACH PORT SHALL BE INSTALLED AT 90 DEGREES APART AND SHALL CONSIST OF FOUR INCH COUPLINGS. ADEQUATE AND SAFE ACCESS TO ALL TEST PORTS SHALL BE PROVIDED BY THE APPLICANT WITHIN 24 HOURS OF A REQUEST BY THE AQMD TO CONDUCT A TEST.

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17. A SAMPLING PORT, OR OTHER METHOD APPROVED BY THE AQMD, SHALL BE INSTALLED AT THE INLET GAS LINE TO THE FLARE.

18. THE APPLICANT SHALL CONDUCT A SOURCE TEST ANNUALLY OR PER THE APPROVED 1150.1 COMPLIANCE PLAN. THE TEST SHALL BE PERFORMED IN ACCORDANCE WITH AQMD APPROVED TEST PROCEDURES. THE TEST SHALL INCLUDE, BUT MAY NOT BE LIMITED TO, A TEST OF THE FLARE FOR:
   A. LANDFILL GAS COMPOSITION AND HEATING VALUE.
   B. LANDFILL GAS FLOW RATE, SCFM (INLET)
   C. TOTAL SULFUR COMPOUNDS AS H2S, PPMV (INLET)
   D. TEMPERATURE, F (EXHAUST)
   E. FLOW RATE, DSCFM (EXHAUST)
   F. NOX, LBS/HR AND LBS/MMBTU (EXHAUST)
   G. SOX, LBS/HR (EXHAUST)
   H. CO, LBS/HR (EXHAUST)
   I. PM, LBS/HR AND GR/DSCF (EXHAUST)
   J. TOTAL NON-METHANE ORGANICS, LBS/HR, INLET AND EXHAUST
   K. RULE 1150.1 TOXIC COMPOUNDS, PPMV, INLET AND EXHAUST

19. EMISSIONS OF NOX FROM THE FLARE SHALL NOT EXCEED 0.06 LBS MILLION BTU OF HEAT.

20. THE SKIN TEMPERATURE OF THE FLARE SHROUD WITHIN FOUR FEET OF ALL THE SOURCE TEST PORTS SHALL NOT EXCEED 250 DEGREES F. IF A HEAT SHIELD IS REQUIRED TO MEET THIS REQUIREMENT, ITS DESIGN SHALL BE APPROVED BY THE AQMD PRIOR TO CONSTRUCTION. THE HEAT SHIELD, IF REQUIRED TO MEET THE TEMPERATURE REQUIREMENT, SHALL BE IN PLACE WHENEVER A SOURCE TEST IS CONDUCTED BY THE DISTRICT.

21. EMISSIONS RESULTING FROM FLARE NO. 2 SHALL NOT EXCEED THE FOLLOWING:

ROG	0.66 LBS/HR
NOX	2.58 LBS/HR
SOX	3.16 LBS/HR
CO	2.37 LBS/HR
PM10	1.31 LBS/HR

22. ANY BREAKDOWN OR MALFUNCTION OF THE LANDFILL GAS FLARE STATION RESULTING IN THE EMISSION OF RAW LANDFILL GAS SHALL BE REPORTED TO THE AQMD WITHIN ONE HOUR OF OCCURRENCE, AND IMMEDIATE REMEDIAL MEASURES SHALL BE UNDERTAKEN TO CORRECT THE PROBLEM AND PREVENT FURTHER EMISSIONS INTO THE ATMOSPHERE.

23. ALL RECORDS SHALL BE KEPT FOR A PERIOD OF AT LEAST TWO (2) YEARS AND SHALL BE MADE AVAILABLE TO AQMD PERSONNEL UPON REQUEST. A RECORD OF THE HOURS OF FLARE OPERATION SHALL BE INCLUDED.

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24. FLARE START-UP TIME SHALL NOT EXCEED 30 MINUTES. ANY OUTAGE THAT RESULTS IN THE SHUTDOWN OF THE FLARE SHALL NOT BE CONSIDERED A BREAKDOWN PROVIDING NO EMISSION OF RAW LANDFILL GAS OCCURS.

25. MITIGATION MEASURES, OTHER THAN THOSE INDICATED IN THESE CONDITIONS, WHICH ARE DEEMED APPROPRIATE BY AQMD PERSONNEL AS NECESSARY TO PROTECT THE COMFORT, REPOSE, HEALTH OR SAFETY OF THE PUBLIC, SHALL BE IMPLEMENTED UPON REQUEST.

NOTICE

IN ACCORDANCE WITH RULE 206, THIS PERMIT TO OPERATE OR COPY SHALL BE POSTED ON OR WITHIN 8 METERS OF THE EQUIPMENT.

THIS PERMIT DOES NOT AUTHORIZE THE EMISSION OF AIR CONTAMINANTS IN EXCESS OF THOSE ALLOWED BY DIVISION 26 OF THE HEALTH AND SAFETY CODE OF THE STATE OF CALIFORNIA OR THE RULES OF THE AIR QUALITY MANAGEMENT DISTRICT. THIS PERMIT CANNOT BE CONSIDERED AS PERMISSION TO VIOLATE EXISTING LAWS, ORDINANCES, REGULATIONS OR STATUES OF OTHER GOVERNMENT AGENCIES.

EXECUTIVE OFFICER

Dorris M Bailey

By Dorris M.Bailey/TK01
3/18/2004

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